Interpreting Medical Artifacts

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Introduction: A Brief Report on the History of Medical Collections

Over the past several decades, medical and surgical instruments—that is, those items used to diagnose and treat patients—have become increasingly valued by medical professionals, collectors, curators, and those who visit museums. The major private and public medical museums in the United States acquired the bulk of the collections for which they are famous in the late nineteenth and twentieth centuries.

Earliest American-made surgical set in the National Museum of American History collection. The set was made by J. Cassell of Baltimore, who was in business from 1823 to 1834. The set was owned by Dr. Colin Mackenzie (1775–1827). The case is wood with silverplated oval escutcheon and bale handle.

(Courtesy of the National Museum of American History)

From Offices to Museums

Instruments began their journey into museums through various routes. Some were stored in offices, cabinets, attics, or basements until the physician, surgeon, nurse, or heir presented them to a hospital library or medical school. Some of those items—unique by virtue of design, function, inventor, or user—emerged to be enshrined in special exhibitions celebrating the birth or anniversary of a prominent physician or medical event. In time, however, storage of historic objects became a significant problem for institutions that needed space for other activities. Therefore, the instruments were offered to historical, state, and national museums, often to be placed in storage once again. All the while, many donors naively believed that their gifts would be on exhibition. (Donors have an insatiable desire to see their contributions displayed, understanding little about either the need and use of object collections in storage or the keen competition for exhibition space in all museums.)

Simultaneously, connoisseurs, medical leaders, educators, and, more recently, investors (each attracted for different reasons, including the pleasing designs, colors, and materials from

by Audrey B. Davis
Guest Editor

which medical instruments were made before the bacteriological era) selected ornate and well-crafted medical items for their private collections as *objets d'art*. Those private collectors' caches of instruments have become the source of some of the finest examples of medical hardware, a number of which now reside in museum collections or are occasionally displayed in special exhibitions.

Care of Instruments

As late as two decades ago, most private and museum collectors were not aware of the special preservation methods required for medical instruments; indeed, training for museum professionals barely existed. Untutored and overzealous individuals unwittingly altered the historical value of instruments with the intention of improving the appearance of an item by replacing missing parts, refinishing surfaces, and making other structural changes. Undocumented changes in instruments obviously alter the historical significance of an object. Furthermore, even professionally acceptable preservation techniques of the past have not always proven to have had a neutral effect on an object. Some objects that were not chemically cleaned in the past may have escaped more damage than they received as a result of neglect, for example. Preservation techniques are constantly evolving.

Rise of Specialist Dealers

Until two decades ago, few dealers were interested in medical instruments (with the exception of instruments that crossed the science-medicine borderline, such as microscopes). Dealers began to specialize in the sale of medical objects only in the 1970s, when Heinz Norden in London concentrated on

This splendid case was presented to John Maynard Woodworth (1853-1879), first Surgeon General of the United States (1871-1879). The set bears the stamp of two New York instrument manufacturers, W. F. Ford and Shepard & Dudley. It was donated by the Department of Health, Education and Welfare in 1980.

(Photograph by A. Russetti, Cleveland, courtesy of the National Museum of American History)

pre-twentieth-century pieces, especially such pharmaceutical items as drug jars, bleeding bowls, and medicinals.

Collectors and the few curators who were in charge of medical collections could not readily consult dealer or auction catalogs to buy or appraise diagnostic and surgical implements. Documentation for the items, contemporary trade literature and secondary publications, was scarce; only early surgical instruments were well documented in the classic European texts on surgery.

Among medical museums, the Wellcome, the Armed Forces Institute of Pathology, and the Smithsonian Institution avidly collected trade literature, although they did so without the systematic cataloging support available in major libraries. Trade literature, when retained even in as extensive a collection as the New York Academy of Medicine, was usually not cataloged or might be listed as ephemera and therefore was not easily accessible.

As I discovered with Mark Dreyfuss when we were compiling our 1986 bibliography on medical trade literature, *The Finest Instruments Ever Made*, it was necessary to travel to libraries and make bibliographic entries for each piece with the item in hand. Although medical rare book dealers have flourished in most western European countries and the United States, the market (and value!) of trade literature is relatively recent. In response, an organization has taken on the responsibility of creating an international database of object collectors and dealers in medical items. The services of Finders Keepers are available for originating both buying and selling transactions. The address is Finders Keepers, Post Office Box 1188, Ridgefield, CT 06877.

Collectors' Groups

Until recently there were few collegial opportunities for medical practitioners who collected items related to special interests, often to complement book collections. The Medical Instrument Collectors Association, the first such group in the United States, was formed in the mid-1980s in New York City by Dr. M. Donald Blaufox. About the same time, the Optical Heritage Society, concentrating on ophthalmological and optometric collections, grew out of a meeting at the National Museum of American History, Smithsonian Institution. Both groups meet annually to hear talks about instruments and to display special items; they also communicate through newsletters and special mailings. (For further information, write Dr. M. Donald Blaufox, Medical Instrument Collectors Association, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Bronx, NY 10461, and Dr. Charles Letocha, Optical Heritage Society, 444 Rathon Road, York, PA 17403.)

Opportunities for Collecting

The scarcity and rising cost of traditional medical artifacts may limit incentives to collect, yet a broadening of mission and awareness in museum collecting offers other possibilities. There are many lacuna to fill in with items previously overlooked or not considered germane to the history of medicine. Among such items are those related to patient care (especially among women,

children, and various ethnic and minority groups) and to alternative types of medicine (including chiropractic, osteopathy, homeopathy, and others), which have not been as assiduously collected as their past popularity and significance warrant.

Since alternative forms of medicine frequently served poor patients, the items involved were often "used up" or survived in poor condition. What remains are rapidly becoming prized collectibles and therefore have become quite expensive. Without artifacts representing all types of medicine and all types of patients it will be impossible to mount meaningful exhibitions in the future. The Winter, 1992, issue of *Caduceus*, for example, illustrates types of items that could be used to depict Native American health care and also methods for meaningful interpretation of that data.

Heart pump donated by the Department of Health and Human Services, National Institutes of Health. The pump was developed by Dr. Michael E. DeBakey.

(Courtesy of the National Museum of American History)

Introduction to this Issue

This issue represents the work of researchers on the leading edge of medical museology. It is a pleasure to express my gratitude for their kindness in responding to my request to present their ideas at an American Association for the History of Medicine (AAHM) workshop in Seattle in 1992 and to introduce their important work in print.

James M. Edmonson, who has undertaken some of the long-overdue spadework needed to understand how medical instruments were constructed and what their actual use entailed, prepared a bibliography of recent publications that anyone interested in the history of medical technology should read. That bibliography (including his own landmark articles) is printed after his essay describing how he was drawn into the history of medical instruments.

Other authors interpret and explain medically related objects, artifacts, and spaces. Larry Bliquez brings us up to date on the discovery and interpretation of ancient medical instruments. It is only over the past decade that important discoveries about those objects were made, to which Bliquez's contributions are stellar. Gretchen Worden argues for preserving a multiplicity of objects since the reasons for studying them vary and each example of a type may provide different and important information not duplicated in other models; further-

more, she shows how the variety of instruments within a group may suggest interpretations not apparent when observing only a few examples of the instrument. James Connor's innovative paper explores the possibilities of regarding medical buildings as objects. Robert Goler, who could not attend the AAHM session, prepared a directory of Chicago surgical instrument makers from 1845 to 1899, which will be useful to those of us constantly trying to identify stray instruments that are brought to our attention.

Together, these authors not only express the multidimensional interests of historians and keepers of medical technology but provide incentives for further study. They bring us closer to the more inclusive history of medicine that the 1993 Fielding H. Garrison Lecturer, Dean Rosemary Stevens of the University of Pennsylvania, argued for recently in her AAHM presentation in Louisville. She encouraged historians to explore the history of technology and medicine and to prepare themselves by investigating the actual practices and instruments applied to the patient.

We must conclude that museum collections remain under-explored and under-exploited as a basis for understanding the history of medicine. Happily, this also means that there are many fascinating opportunities for students to engage in as future historians of medicine.

■

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The Role of Instruments in the Study of Greco-Roman Surgery

Because of the enormous progress made in western medicine in this century, we naturally view the medicine of previous eras as less effective. Our attitudes may become downright condescending when we consider the most radical of medical interventions, surgery. Yet the study of Greco-Roman surgery is enjoying a veritable flurry of scholarly activity based on new multidisciplinary approaches that expand the traditional approach: examining the relationship between descriptions of operations in literary sources and surgical instruments brought to light by archaeological excavation.

Ancient Literary Sources

By the time of the Roman Empire, approximately 120 different surgeries were being performed, mostly by Greek practitioners.[1] While the majority of operations were "superficial" in the sense that they were performed on the surface or in the natural orifices of the body, one is still impressed with the vigorous enterprise of Greco-Roman surgeons. Perhaps the best witness to those activities was Paul of Aegina (625–690).[2]

Because Paul wrote in the seventh century, he can rightly be regarded as an early Byzantine. Nevertheless, Paul's surgical descriptions are primarily extracted from the works of earlier surgeons whose full treatises are lost. These include Antyllus, Archigenes, and Leonidas. Imbedded in the descriptions of Paul and such earlier authorities as Hippocrates, Celsus, Galen, Oribasius, and Aetius are the names and uses of the instruments available.

Archaeological Finds of Vesuvius

Modern interest in Greco-Roman surgery was inspired by the uncovering of the cities buried by the eruption of Mount Vesuvius in 79 A.D. In the eighteenth and early nineteenth centuries, Bourbon excavators brought to light at Herculaneum and Pompeii a number of instrumentaria containing objects that looked very much like surgical tools. Those items and other portable finds were taken to the Royal Palace at Portici, where in 1754 they were described in a book published by Monsignor Antonio Bayardi.[3] Bayardi's *Catalogo*, although the first work detailing the surgical instruments from the lost cities, was roundly criticized because he included no illustrations and his descriptions were unsystematic and uneven.[4] As a

by Lawrence J. Bliquez

Figure 1. This 1931 photograph from the Naples Museum illustrates well how surgical instruments became contaminated with other minor objects.

In the upper row are, left to right, a clamp for revetment slabs of marble, a birthing hook of iron or steel with a bronze or brass handle, four knives that do not conform to established surgical types, and three spoons, two of which cannot be associated with medical practice.

The bottom row contains a bone elevator, a tube (probably from a household drainage apparatus), a cannula, a phlebotome, a surgical drainage tube or clyster, an unidentified (surely nonsurgical) object, a small tube that may or may not have been a cannula, another bone elevator, and a cautery of 24 cm in length.

(Courtesy of the Soprintendenza Archeologica di Napoli e Caserta)

result, recognition of many of the instruments that he had before him is impossible today. Yet Bayardi does deserve credit for establishing the method of studying the instruments. He was the first to try and match each one with the descriptions of shape and function offered in the writings of ancient surgeons.

In the first quarter of the nineteenth century, the Vesuvian instruments were transferred to the Naples Museum, and Bayardi's work was expanded by more careful investigators. Benedetto Vulpes, an important person in Neapolitan medical circles, delivered his findings in 1846 in a series of now-classic lectures to the Real Accademia Ercolanese di Archeologia. Vulpes was generally successful in describing, illustrating, and identifying the Vesuvian instruments.[5]

Approximately sixty years later J. S. Milne, a Scottish surgeon with a good knowledge of classical languages, enlarged the picture by including in his study instruments from the collections of museums of western Europe.[6] As a result, he considerably expanded knowledge about classical surgery by recognizing a number of instrument types not occurring in Naples. Milne's *Surgical Instruments in Greek and Roman Times*, published in 1907, continues to be the definitive handbook on the subject for the English-speaking world.

Contamination and Misidentification

The efforts of Vulpes and Milne were affected by a problem that bedevils many studies of surgical tools kept for long periods in museums: contamination. Contamination arises from the fact that, with notable exceptions, many instruments employed by ancient practitioners were virtually identical to articles used in the home or in other professions. Included in that class of objects are tweezers, spatulae, spoons, ligulae, kohl-stick probes (i.e., those with "olivary" enlargements), shears, styli, needles, strigils, tubes, and various containers, both rectangular and cylindrical. Because such items tend to be the same, whether used by physicians or others, it is easy to see how surgical tools could become misgrouped with everyday articles, especially when—as was often the case in the nineteenth century—all such items were uniformly classified as minor objects and stored together (fig. 1).

Even Milne often did not recognize what he saw. In addition to misidentifying real surgical tools, he described some everyday spoons, pins, netting needles, and Renaissance cutlery as medical, and he accepted some modern bleeding cups as ancient.[7]

Beginnings of a Typology

Not until the late twentieth century was a typology created. Ernst Künzl of the Römisch-Germanisches Zentralmuseum in Mainz assembled in 1983 the first solid and dependable body of material from which accurate observations could be made and general conclusions drawn.[8] Künzl dealt with the problem of contamination by concentrating only on instruments from "closed finds"—specifically, well-documented instrumentaria removed from the graves of surgeons, as opposed to contaminated museum collections. Grave instruments have become an essential source for researchers.

Figure 2. Lunated cautery of iron from Bingen-am-Rhein, 9.5 cm in length

(Courtesy of Stadtverwaltung Bingen/Rhein)

Among the many interesting finds recovered from graves are a large and diverse set of instruments from Bingen, Germany.[9] The set apparently belonged to a military surgeon, perhaps trained in or even a native of Alexandria.[10] As might be expected, the individual tools reflect the rough-and-ready practice of a surgeon connected with the Roman legions. In addition to large scalpels and bleeding cups, bone levers, chisels, and a splendid set of trephining gear, the Bingen instrumentarium has produced the only specimen so far recovered of a "lunated" cautery (fig. 2). That rare instrument, which was used to treat gangrenous foreskin, was identified through descriptions in the writings of Oribasius and Paul.[11]

Other noteworthy finds include a set of catheters that lately surfaced in an extensive instrumentarium from Italy acquired by the British Museum (fig. 3).[12] Among them is one of the only two specimens of the female type so far known.[13] The two representatives of the male type are graduated in size, as are two male catheters now in Baltimore, said to have been found at Colophon.[14]

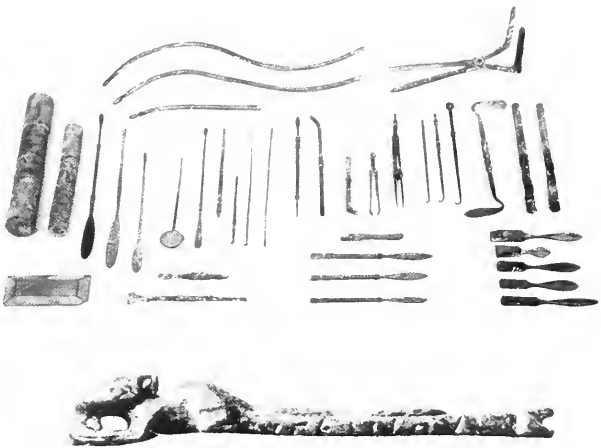

Figure 3. Instrumentarium from Italy featuring catheters (male and female), a rectal speculum, instrument cases, spatulas, spoons, cataract needles/probes, forceps, retractors, chisels, a grinding stone, iron cauteries, a curette, and scalpel handles. The longest of the catheters is 30.25 cm. (Courtesy of the British Museum)

Figure 4. Scalpel handle 8.3 cm long from Ephesus in the shape of a mouse gnawing some object. Inscribed on it is the name of its owner, Hygeinos Kanpylios. Note the slot to accommodate its now-missing steel blade. (Courtesy of the Römisch-Germanisches Zentralmuseum, Mainz)

Surgical Specialties

A remarkable instrumentarium from Ephesus (first published in 1980) reflects expertise in dealing with conditions of the urinary tract.[15] It contains a scalpel handle in the shape of a mouse (fig. 4), probably reflecting the owner's devotion to Sminthian Apollo, whose healing cult was popular in Asia Minor.[16] The name of the owner, Hygeinos Kanpylios, is actually inscribed on the instrument. Of additional interest are two surgical knives equipped at one end with hooks having roughened interior surfaces (fig. 5). Lithotomy knives, used in the removal of bladder stones, were first

Figure 5. Instruments from the Hygeinos Kanpylios set from Ephesus.

Included, left to right, are four retractors, a cataract needle, a spoon, a lancet/cautery, three spoons/curettes (two with roughened surfaces), and three instruments for bladder stone operations. The two specimens at the far right feature both the special hook for the purpose of extracting the stone and a slot for a steel blade (now missing) designed to expose it. To their left is a tool having only the hook, balanced on the other end by a double retractor.

Note the "knotty club" motif and a lion's head on the sharp retractor at the extreme left and the "knotty club" again on the cataract needle to its right. Those motifs symbolize Hercules, whose bust appears on the scalpel handles from Pompeii shown in figure 6. Length of the longest lithotomy knife is 16.9 cm.

(Courtesy of the Römisch-Germanisches Zentralmuseum)

identified by a clear description of the type preserved by the second-century writer Rufus of Ephesus. The presence of the rare knives, along with another piece with the hook alone, shows that Hygeinos Kanpylios had a special interest in bladder surgery.[17] Thus in one set we find not only the name of a doctor and evidence for religious associations but also a surgical specialty. Because the image of the hero Hercules and his symbol, the knotty club, appears on many heavy-duty surgical tools (figs. 5 and 6), it has been argued that he too had a special connection with surgery.[18]

Surgical specialties, by the way, seem to have come into their own in the Roman Empire. In addition to sets reflecting interest in the removal of bladder stones we can point to ensembles featuring small scalpels and special retractors as being of particular use to ophthalmologists;[19] specula, birthing hooks, and douching apparatus indicate gynecological expertise (figs. 1 and 7).

Underwater archaeologists have of late made important contributions by adding not only sets of instruments but also caches of drugs such as those contained in the more than 130 boxwood containers found on a wreck of the first century B.C. in the Gulf of Baratti.[20]

Forgeries

In addition to the recovery of valuable new survivals manufactured in antiquity there has also been an unwelcome influx of forgeries created in modern times. Early in this century reproductions of well-known instruments from the Vesuvian cities were produced for instructional purposes in Naples by S. De Angelis and Sons, J. Chiurazzi and Sons, and G. Sommer and Son. But those sets are easily recognized and were not created to deceive.[21] More insidiously, there recently appeared on the antiquities market seven separate sets of bogus instruments created for profit alone (fig. 8).[22]

The forgeries combined characteristics of genuine instruments with certain novel features. The curious combination resulted in brief if guarded acceptance until metal analysis showed that the material, which was brass, contained zinc in excess of 28%, an impossibly high figure given ancient methods of manufacturing copper alloys. Metal analysis and examination of corrosion products on the surface of tools are now standard procedures in evaluating new instrumentaria. Similar corrosion products indicate or confirm a common provenience and similar metal composition suggests a common origin as a set.[23]

Contemporary interest in metal analysis has prompted speculation on the techniques whereby surgical instru-

Figure 6. Scalpel handles, approximately 7 cm in length, from Pompeii. Two of the handles feature the bust of Hercules, who evidently was associated with surgery because his mythical career was characterized by suffering and endurance. Note the slot for a now-missing steel blade on the left-hand specimen.

(Courtesy of the Römisch-Germanisches Zentralmuseum)

ments were made in the Roman Empire. For example, as most instruments were made of quaternary and especially ternary alloy of copper with tin, zinc, and lead, the affects of different mixtures of these metals have been probed and the requirements of various instruments noted.[24]

Ancient Manufacturers

Of course, one inevitably wonders who manufactured the instruments. It has been observed on the basis of common features and decorative motifs that certain instruments must have had a common origin.[25] Lately, it has been possible to trace one instrument in Naples back to a shop on the Via Stabiana in Pompeii where, according to the excavation reports, other surgical instruments and hardware were found.[26] The Via Stabiana thus provides the first identified manufacturing location for surgical instruments. In Pompeii at least, it seems that medical instrument manufacturers were the ordinary metal workers who forged all sorts of tools for use in the home and the workplace. That is not to say that some artisans were not more accomplished than others at making surgical tools; nor that the manufacturers did not take directions from physicians who needed specialized instruments (like lithotomy knives) or complex ones (like forceps and specula).[27]

Ancient Practitioners

The locations where Roman physicians or surgeons actually practiced is a subject of great interest. Finds of surgical instruments in bathing complexes at Xanten, Trier, and Weissenburg mark them as places where operations were performed.[28] But the most complete picture can be drawn at Pompeii. Not only is the town well preserved, but the excavation notes and instruments kept at the Pompeii Antiquarium and at Naples allow for the identification of surgical sites as well as a reasonably accurate reconstruction of the instrumentaria found there.[29] In the portion of Pompeii so far excavated, instruments are attested to for approximately twenty-one locations, all shops or private houses.

In many cases, the tools are few and relatively simple, involving no more than spoons, ligulae, probes, and perhaps a scalpel. Thus it appears that the local practitioner was not occupied full time with medicine. The local practitioner may in fact have been the master of the house. Given the self-sufficient

Figure 7. Trivalve speculum, 20.5 cm in length, recovered in the Casa del Medico Nuovo (II) in Pompeii

(Courtesy of the Römisch-Germanisches Zentralmuseum)

nature of the Roman character, it is likely that many Pompeians would have preferred not to consult an outsider. In a few cases, however, the reconstructed instrumentaria are so extensive that they must surely have been owned by a full-time physician. The Casa del Medico Nuovo (11), for example, a modest dwelling on the Via di Nola, yielded more than forty instruments and parasurgical items.[30] Items found there—including specula, spoons that might have served as uterine curettes, a uterine douche, and a birthing hook (used for removing dead or impacted fetuses)—indicate that the surgeon had an abiding interest in gynecology (See figs. 1 and 7). Similar equipment at two other Pompeian sites also suggests "gynecological clinics."[31]

Conclusion

As the reader can see, contemporary instrument studies have led away from consideration of the instruments as self-contained objects of investigation and toward their use as a means of exploring broader questions. In that purpose we can distinguish the work of such pioneers as Vulpes and Milne from that of their successors, especially those working since 1980.

It is likely that future inquiries will be even more multidisciplinary in nature as philologists, historians, archaeologists, and technical specialists integrate their findings about the manufacture, the employment, and the distribution of instruments with other topics of interest. Among the latter we may list the growth of medical expertise in the Greco-Roman world from earliest time to the Byzantine period, the position of women in antiquity, and intercultural exchanges between Greeks and Romans and between the Romans and other peoples, just to name a few.

■

Notes

1. See Pliny, *Natural History*, XXIX, 17.

2. The only full translation of Paul into English is still Francis Adams, *The Seven Books of Paulus Aegineta* (London: Printed for the Sydenham Society, 1844–1847); the sixth book is particularly replete with information on surgery. The standard Greek text is J. L. Heiberg, *Corpus Medicorum Graecorum*, Vol. IX (Leipzig and Berlin: B. Teubner, 1921, 1924).

3. Ottavio Antonio Bayardi, *Catalogo degli antichi monumenti dissotterati della discoperta città di Ercolaneo* (Naples: Nella Regia Stamperia, 1754).

4. Bayardi as a man: "Il più insulso e ridicolo uomo che abbia mai lasciato memoria di si negli atti della scienza" (The silliest and most ridiculous man who ever left remembrance of himself in the annals of science), Domenico Comparetti and Giulio de Petra, *La villa ercolanese dei Pisoni; i suoi monumenti e la sua biblioteca* (Turin: E. Loescher, 1883), p. 53. For his role at Herculaneum, see F. Barnabei, "Gli scavi di Ercolano," *Atti della R. Accademia dei Lincei* 2 (1878): 751–68, especially p. 759. For Bayardi's scholarship, see Charles Walston [Waldstein], *Herculaneum, Past, Present, and Future* (London: Macmillan, 1908), p. 130; Walston calls Bayardi's *Prodromo alle antichità di Ercolano* (Naples: Regale

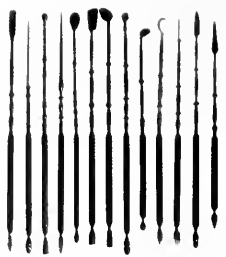

Figure 8. A set of fake surgical instruments, approximately 20 cm in length, combining features of authenticated types with novel characteristics. At least five such sets were sold in the United States and Europe before the forgery was uncovered.

(Courtesy of the J. Paul Getty Museum)

Stamperia Palatina, 1752)—"an amazing fardel of pedantry and stupidity throwing absolutely no light upon the excavations" and the *Catalogo* "a very incompetent — volume." See also Harold Acton, *The Bourbons of Naples* (London: Methuen, 1956), pp. 88–89.

5. Benedetto Vulpes, *Illustrazione di tutti gli strumenti chirurgici scavati in Ercolano e in Pompei* . . . (Naples: Della Stamperia Reale, 1847).

6. John Stewart Milne, *Surgical Instruments in Greek and Roman Times* (Oxford: Clarendon Press, 1907; New York: Augustus M. Kelley, 1982).

7. See, for example, ibid., p. 56, pl. X, fig. 1 (cataract needle misidentified as a simple probe); p. 158, pl. LI, fig. 1 (sharp retractor misidentified as a stylet); p. 34, pl. VII, fig. 2 (needle holder combined with a blunt dissector misidentified as a lancet); p. 79, pl. XIX, fig. 3 and pl. XX, fig. 5 (fancy spoons taken as medical); p. 56, pl. X, figs. 3, 4 (simple pieces of metal seen as probes); p. 84, pl. XXII figs. 1–5 (hairpins and netting needles taken as bifurcated probes); p. 27, pl. V, figs. 1, 2 (Renaissance cutlery); and p. 103, pl. XXXVI, figs. 1, 3 (modern bleeding cups).

8. Ernst Künzl, with Franz J. Hassel and Susanna Künzl, *Medizinische Instrumente aus Sepulkralfunden der römischen Kaiserzeit* (Bonn: In Kommission bei R. Habelt, 1983) and *Sonderdruck aus den Bonner Jahrbüchern*, Bd. 182, 1982.

9. Ibid., pp. 80–85; J. Como, "Das Grab eines Römischen Arztes in Bingen," *Germania* 9 (1925): 152–62.

10. See Ch. Picard and J. Sainte-Fare Garnot, "Lé trisor chirurgical de Bingen (Rhénanie)," *Revue archéologique* 1 (1961): 70–71.

11. Lawrence J. Bliquez, "An Unidentified Roman Surgical Instrument in Bingen," *Journal of the History of Medicine and Allied Sciences* 36 (1981): 219–20, and "The Bingen Cautery: An Addendum," ibid., 39 (1984): 68–69.

12. Ralph Jackson, "A Set of Roman Medical Instruments from Italy," *Britannia* 17 (1986): 119–67.

13. The other is in Carnuntum. Dr. Antje Krug (who will soon publish it) informs me *per litteras* that the Carnuntum catheter resembles the one in the British Museum. For a seviceable photo, see R. Watermann, *Mensch und Medizin, zwischen Macht und Militär der römischen Kaiserzeit* (Frankfurt am Main: Gerhard Michler Verlag, 1980), p. 86, fig. 44.

14. Richard Caton, "Notes on a Group of Medical and Surgical Instruments Found near Kolophon," *Journal of Hellenic Studies* 34 (1914): 114–18.

15. See Künzl et al., *Medizinische Instrumente*, pp. 46–48.

16. E. Künzl, "Was soll die Maus auf dem chirurgischen Instrument?" in *Antidoron: Festschrift für Jürgen Thimme* (Karlsrue: C. F. Muller, 1983), pp. 111–16.

17. E. Künzl, "Eine Spezialität römischer Chirurgie: die Lithotomie," *Archäologisches Korrespondenzblatt* 13 (1983): 487–93.

18. See my "The Hercules Motif on Greco-Roman Surgical Tools," in *From Epidaurus to Salerno and Montpellier, Colloquium Ravello, 1990* and *PACT Journal of the Centro Universitario Europeo per i Beni Culturali*, vol. 34 (in press).

19. See the instrumentaria of Sextus Polleius Sollemnis and Gaius Firmius Severus in Victor Deneffe, *Chirurgie Antique: Les Oculistes Gallo-Romains au IIme siècle* (Antwerp: H. Caals, 1896); Künzl et al., *Medizinische Instrumente*, pp. 57–58, 61–66.

20. A. J. S. Spawforth, "Roman Medicine from the Sea," *Minerva* 1 (1990): 9–10.

21. Virtually entire exhibits of Roman surgical tools have been made up of the reproductions; see Frank Tarbell, *Catalogue of Bronzes . . . in the Field Museum*

of Natural History Reproduced from Originals in the National Museum of Naples, Field Museum of Natural History Publication 13 (Chicago, 1909).

22. Bliquez, "The Getty instrumentarium: A revised opinion," *J. Paul Getty Museum Journal* 14 (1986): 79–80; E. Künzl, "Eine serie von Falschungen römischer medizinischer Instrumentarien," *Archäologisches Korrespondenzblatt* 16 (1986): 333–39.

23. Jackson, "A Set of Roman Medical Instruments from Italy," pp. 119–67, and "Roman doctors and their instruments: Recent research into ancient practice," *Journal of Roman Archaeology* 3 (1990): 5–27, especially pp. 10–11.

24. G. M. Longfield-Jones's summary in John F. Healy, *Mining and Metallurgy in the Greek and Roman World* (London: Thames and Hudson, 1978), pp. 246–51.

25. E. Künzl, "Einige Bemerkungen zu den Herstellern der römischen medizinischen Instrumente," *Alba Regia* 21 (1984): 59–65.

26. Bliquez, *Surgical Instruments and Other Minor Objects in the National Archaeological Museum of Naples, with a Catalogue of the Instruments in the "Antiquarium" at Pompeii by Ralph Jackson* (forthcoming from Verlag Philipp von Zabern).

27. Surely surgeons themselves took the initiative in designing instruments as new and more efficient surgical techniques were developed. In this connection we may cite a series of inscriptions at Ephesus attesting to a competition in which physicians either invented new instruments or found new uses for old ones; see *Inschriften aus griechischer Städte aus Kleinasien, Band 14, Die Inschriften von Ephesus, Teil IV*, herausgegeben von H. Engelman, D. Knibbe, R. Merkelbach (Bonn: R. Habelt, 1980), inscription nos. 1160–69. These date primarily from the reign of Antoninus Pius.

28. E. Künzl, "Operationsräume in Römischen Thermen," *Bonner Jahrbücher* 186 (1986): 492–509.

29. Bliquez, *Surgical Instruments*.

30. For the location of the house, see Hans Eschebach, *Die Arzthäuser in Pompeji* (Feldmeilen: Raggi-Verlag, 1984) and *Antike Welt, Sondernummer* 15.

31. Bliquez, "Gynecology in Pompeii," *Proceedings of the Congress of Ancient Medicine in Its Socio-Cultural Context, Leiden, 13–15 April 1992* (Clio Medica Series, Rhodopi Publishers).

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Learning from the Artifact: Surgical Instruments as Resources in the History of Medicine and Medical Technology

What can be learned from artifacts? How does one shape the inquiry, and how can one carry it out? Unfortunately, I cannot answer those questions with a simple prescription, or even a methodology, although others have attempted to do so.[1] Instead, I would like to suggest from my own experience how medical artifacts can be studied and what may be learned from or through them.

Interpreting Surgical Instruments

In one sense, my comments form a partial response to Ghislaine Lawrence's thought-provoking essay, "The ambiguous artefact: Surgical instruments and the surgical past," in which she disparaged the infrequent use of artifacts, specifically surgical instruments, in the study of medical history.[2] Historians of surgery and medicine have seldom made effective use of instruments preserved in museum collections, she correctly contends. When artifacts do become the object of study, they are analyzed superficially. More often than not, instruments are treated as mere three-dimensional substitutes for illustrations. Lawrence believes, and I agree, that much more can be learned from the close, thoughtful examination of instruments.

Lawrence suggests a variety of perspectives, but I will focus upon only one: surgical instrument making, specifically the design and production of instruments. That focus grew from the analysis of one surgeon's armamentarium and its presentation in catalogue form. As I shall explain, once the catalogue had been published, my investigation took off in a somewhat unexpected direction. The story of changes in the forms of late-nineteenth instruments steadily emerged in ever-greater relief.

The focus of my inquiry came to be how instruments had been transformed in response to asepsis and, more generally, how surgical protocol was adapted. Pursuit of the story ultimately opened many avenues of investigation in the history of medical technology, several of which still await full exploration. Preparing or compiling a catalogue, a

by James M. Edmonson

seemingly antiquarian exercise, thus became the point of departure for a historical inquiry into the nature of surgical instrumentation, its design, use, and manufacture.

The Curatorial Challenge

Every curator at some time or another must glance around a storage area, surrounded by shelving full of artifacts, and wonder, What sense is to be made of all these things? The experience can be especially daunting for the neophyte with responsibility for a medical history collection. After all, many of the surgical instruments were designed for a grim—some might even say dread—purpose, while the functions of other medical devices are not apparent, even to someone with medical training.

How are these things, these artifacts, to be studied and analyzed as evidence for the history of medicine, much less presented to the public in a coherent fashion? I must admit that I'm still sorting out those dilemmas, and the process doesn't always move as swiftly as I would like. In fact, it took almost five years of work with the collections of the Dittrick Museum of the Cleveland Medical Library Association before things started to fall into place and fruitful topics of artifact-based research began to emerge clearly. During that time artifacts were featured in museum exhibits, chiefly in an illustrative mode, but had not yet been the subject of in-depth investigation in their own right.

The Gustav Weber Instruments

Systematic, careful study of Dittrick Museum artifacts began in 1986, with the preparation of a catalogue of the Gustav Weber collection of surgical instruments.[3] The ostensible purpose of the Weber catalogue was to "showcase" the remarkable personal surgical armamentarium of a prominent Cleveland surgeon. Although the tone of the catalogue was more celebratory than analytical, some basic insights could be derived immediately by looking at Weber's instruments in isolation from the rest of the Dittrick holdings. By its very size and diversity, Weber's collection of instruments suggested the broad range of practice encompassed by an individual in the days before extensive specialization. Initially, I intended to furnish descriptions of individual pieces along with an explanation of their utilitarian surgical functions. By physically examining each item, I found that it became easier to understand and explain how each was originally used. At one point, I even brought some of the Gustave Weber instruments home (much to my wife's morbid fascination, I might add), to spend more time poring over them.

The process of scrutiny had an unintended consequence. Actually handling the instruments, knowing them in a tactile as well as visual sense, was a compelling experience; I found myself wanting to know more about the people who had fashioned them. I developed a better appreciation of the work of several instrument makers, especially George Tiemann & Co., whose products figured so prominently among Weber's instruments. At the time, instrument makers and their work was a topic of only secondary interest or importance to

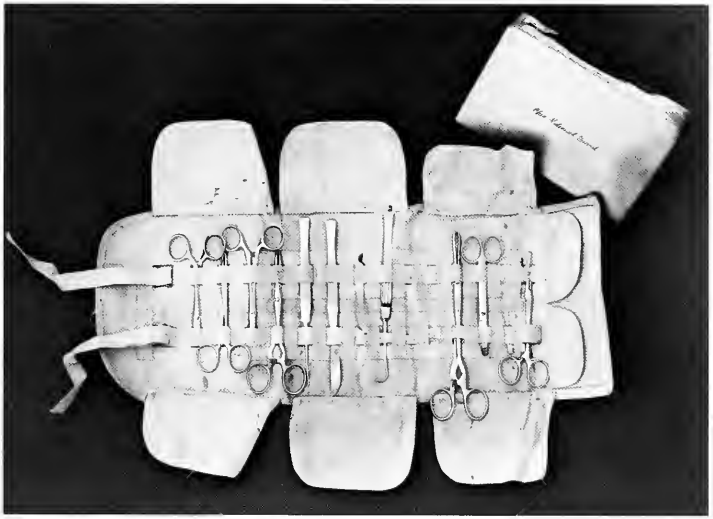

Figure 1. Surgical instruments set, Ohio National Guard, ca. 1898, by Truax, Greene & Company

(Courtesy of the Dittrick Museum of Medical History)

me, but it would loom much larger in subsequent research projects.

Truax and Tiemann

One great aid in preparing the Weber collection catalogue had been Charles Truax's *The Mechanics of Surgery* (1899). From Truax's book came not only explanations of the use of particular instruments but also a general sense of what was going on in the surgical instrument field in the closing years of the last century. Truax's work was brought to my attention by Audrey B. Davis, who had featured it in her 1978 article "Historical Studies of Medical Instruments."[4] I shared her admiration for Truax's achievement and said so in the annotated bibliography of the Weber catalogue.

Jeremy Norman, who skimmed the Weber catalogue with his usual thoroughness, questioned my assertion that *The Mechanics of Surgery* was "the single most useful guide to medical instrumentation of the late nineteenth century." Norman's purpose was not to challenge that assessment, only to explore it. At that time he was in search of titles worthy of inclusion in an upcoming series for Norman Publishing, then a new venture. He confessed that he had never seen Truax's work and was intrigued. I then supplied him with photocopies of various sections of the work. Satisfied that *The Mechanics of*

Figure 2. Surgical instrument set, United States Army, ca. 1910-17, by Truax, Greene & Company

(Courtesy of the Dittrick Museum of Medical History)

Surgery would find an audience among museum curators, collectors, and historians, Norman decided to reprint it in his forthcoming history of surgery series. He invited me to compose the introduction.[5] From that point, my inquiry into the surgical instruments of Truax's day took off.

While composing the Truax introduction, I took time to comb the Dittrick collection for Truax-made pieces. Several surfaced, including two sets of military surgical instruments—one made for the Ohio National Guard, ca. 1898 (fig. 1), and another for the United States Army, ca. 1910–1917 (fig. 2). Closer scrutiny of those instruments revealed insights that opened new paths of investigation. The first observation I can recall was that the Truax pieces differed subtly yet significantly from the instruments in the Weber collection.

Weber's instrument sets, particularly those made by George Tiemann & Co., dated chiefly from the 1870s. According to biographer John H. Lowman, that was the "ripest" period of Weber's surgical career. It was also, I learned, the apogee of traditional instrument making in America before the revolution in form, design, and materials that was brought on by the discovery of asepsis. Pieces

from the earlier period could be distinguished by the elegance of the plush-lined mahogany cases they came in, by their conventional cutlery-like construction (separate handle hafted on the tang of the instrument blade or shaft, for example), and by the use of ebony and ivory for handles.

The Truax sets, although dating from only thirty years later, were altogether different from the Tiemann instruments in the Weber collection. The style of case had changed profoundly. Velvet disappeared in favor of a plain varnished wood interior in one set; in the other, a canvas instrument-roll, housed in a stamped metal box, had displaced the wood case entirely. The Truax instruments tended to be one-piece construction and nickel-plated; the ebony, ivory, and other handle materials had disappeared. All the changes had rendered the instruments more easily sterilized and, hence, germ free.

Two other specific features further distinguished the Truax from the Tiemann instruments. First, the instruments' scissor-action joints were designed so that they could be taken apart. Why was this so, I wondered, and was the feature typical of all later instruments? Second, the instruments bore a variety of markings—usually the maker's or distributor's name (*Truax, Greene & Co.* of Chicago), sometimes the country of origin *(Germany)*, and sometimes markings indicating a patent *(Patented* and *Pat.5.3.92)* or trademark (maker's mark of *Jetter & Scheerer* and/or *Kny-Scheerer Co.)*.

Taken together, those pieces of information constituted what historians refer

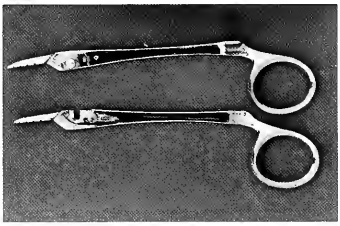

Figure 3. Needle holder featuring "take-apart" joint construction. Designed by Gustav Walcher and introduced by Jetter & Scheerer, it was known as the "Aesculap" joint.

(Courtesy of the Dittrick Museum of Medical History)

to as "internal evidence." What began as poorly understood pieces of evidence ultimately became important clues that could be sorted out and analyzed. Taken together, they offered a much clearer picture of the forces that were at work to transform not only instruments but also the surgical instrument making industry in the late nineteenth century.

Instrument Form and Design

Design, the most obvious outward change in surgical instruments, did not pose a great mystery. Instruments, along with surgical procedures, changed substantially in response to asepsis. Forms, as well as materials, were altered to achieve asepsis with greater certainty. Making scissors and forceps joints detachable offered a way to assure more thorough cleansing and hence sterility (fig. 3). But that was just one of many modifications of form. Its significance lay in the fact that it could be applied to literally thousands of different devices featuring opposing halves that opened and closed like scissors. That aspect of instrument design attracted a considerable amount of attention in the 1880s and therefore became the subject of further inquiry in its own right.[6] In the

pages of surgical instrument trade catalogues, I discovered that the aseptic joint found in the Truax cases (later known as the "Aesculap" joint) had become quite commonplace, if not universal, after the turn of the century.

Manufacturers' Marks

Markings, the second category of physical evidence, yielded several insights about the instrument trade, its economic structure, and the relationship of makers to their surgeon clients. Analysis of the markings, however, was a matter of explication dependent upon a wide range of printed sources, and not limited to the information derived solely from the artifact itself. The markings *Truax, Greene & Co.* and *Germany* on the same instrument, for example, indicated that the company of Charles Truax had become an importer of German instruments (fig. 4). Further research into the vicissitudes of the American market for surgical instruments between the late 1880s and World War I revealed that most other American firms underwent a similar transformation. They became net importers, while scaling back manufacturing operations in the face of lower priced, high-quality German wares. Many small, older American firms succumbed to German competition, and simply closed their doors forever.

Increasing dependence upon a foreign source of surgical instruments was alarming to people in both medicine and industry. Indeed, what made good business sense in peace time would come under serious question with the outbreak of European hostilities leading to World War I. Such concerns are evident

***Figure 4. Bone forceps marked* Truax, Greene & Co. *and* Made in Germany**

(Courtesy of the Dittrick Museum of Medical History)

in official documents pertaining to tariff debates of the era, particularly the records from Senate and House hearings on the state of the instrument trade and wartime United States Tariff Commission studies, notably *The Surgical Instrument Industry in the United States*, published in 1918. These documents told the story of an instrument industry that had once held its own, supplying the American market in the 1880s, only to be overwhelmed by foreign, chiefly German, imports in the 1890s.

Another marking, the crowned staff of Asclepius, is the particular symbol of a manufacturer, the Jetter & Scheerer Company of Tuttlingen, in the Swabian region of Germany (fig. 5). (I recently learned that the staff and the serpent, which comprised the traditional symbol of medicine, were also stylized versions of the letters J and S, initials of the firm's founders, Gottfried Jetter and Karl Christian Scheerer.) The story of Jetter & Scheerer further revealed, in microcosm, some of the factors behind Germany's swift and startling commercial success in the international instrument trade.

Despite popular misconceptions held today, German surgical instruments were not always renowned for their

quality and precision.[7] Indeed, British and French instrument makers far outshone their German counterparts well into the nineteenth century. How, I wondered, had the German industry reversed the situation? By investigating the Jetter & Scheerer story, I learned that the firm based its success upon mechanized, factory production of surgical instruments. This was not so much a surprise as it was a contradiction of American instrument makers' assertion that the secret of the German instrument industry lay in old world craftsmanship and sweatshop labor.[8] The dramatic shift in manufacturing methods in the 1890s enabled the German industry, led by Jetter & Scheerer and its American affiliate Kny-Scheerer Co. of New York, to capture the instrument market in the United States.

Patent Marks

Markings of still another character demanded explanation: *Patented* and *Pat.5.3.92* (fig. 6). Research revealed that on May 3, 1892, Paul Henger of Stuttgart, Germany, obtained United States patent rights for an aseptic instrument joint, also referred to as a "take-apart" joint.[9] That patent constitutes a central element of the whole story of asepsis and instrumentation. The actual inventor, I learned, was Gustav Walcher; the principal beneficiary was Jetter & Scheerer, who produced the joint and permitted others to do so under license. I also discovered that control of the patent enabled Jetter & Scheerer to solidify their market position in two ways: first, the joint form was, when compared to competing forms, much easier to use and tended to stay in a good state of repair longer; and second, it proved easier to manufacture by machine, requiring less fitting and adjusting than its rivals. The fact that a joint or lock had been the subject of a patent also reveals something about the outlook of the producers (instruments makers) versus that of their clients (surgeons). Manufacturers focused on design elements appropriate to a broad spectrum of applications. Surgeons, in contrast, were inclined to focus on the design features of an individual instrument—like the shape of a cutting surface or the bend of a shaft required for a specific surgical operation, for example. Each group had its own agenda or interest that guided its approach to innovation in design.

Beyond those commercially important issues, the patent question also raised a more fundamental issue in medical technology: the appropriateness of patenting new instrumentation. As businessmen, instrument makers were free

Figure 5. Trademark of* Jetter & Scheerer, *Tuttlingen, Germany, and also of* Kny-Scheerer Company, *New York

(Courtesy of the Dittrick Museum of Medical History)

to patent medical and surgical devices. Their surgeon-patrons, as members of a liberal profession, were not; the 1847 American Medical Association code of ethics forbade such activities. Registering a patent (i.e., a restriction) on an item dedicated to alleviating the suffering of mankind was deemed contrary to the proper comportment of a physician. That ethical restriction no longer prevails, but how and in what sequence it changed is poorly documented and begs further inquiry.[10]

In the course of research on artifacts, I observed two phenomena worth mentioning. First, one must live with the artifacts a while before they begin to "speak" to you and start offering clues. Connoisseurship in the domain of medical artifacts comes slowly, for a variety of reasons. Few individuals caring for or doing research in medical history collections have much prior experience analyzing or interpreting artifacts. In most instances, constant or frequent exposure to the collections seems to make up for the lack of a systematic methodology. Over time, and as bewilderment gives way to familiarity and understanding, patterns emerge. Previously strange pieces of information begin to make sense. I have often likened the process to learning a new language. First, one learns basic vocabulary and grammar. Then, halting sentences are formed, often with difficulty. Finally, the stumbling translations between one mode of expression and another evaporate, and the realization dawns that you are thinking in the new language. How one slips across that threshold is impossible to describe, or account for, but the shift is nonetheless real.

***Figure 6. Needle forceps marked* Pat.5.3.92**

(Courtesy of the Dittrick Museum of Medical History)

When does mastery occur, you ask, and how long must the effort be sustained? I cannot give a precise answer and instead simply urge colleagues to persevere in their efforts at working with artifacts.

The second phenomenon observed is what I call the "hourglass" character of artifact research. The scope of inquiry first seems to focus, narrowing upon a particular object to answer a specific question. Then, just as it seems that you are nearing the answer, the perspective gradually broadens to reveal a number of related research areas suggested by or derived from the original topic. Instead of experiencing the satisfaction of an expert, a feeling that should come with the acquisition of knowledge, one is left

with a humbling awareness of how superficial that knowledge is.

One should not be discouraged, however. Several newly-revealed avenues of research lie ahead, begging for inquiry. The difficulty resides only in choosing which one promises to be the most rewarding!

■

Notes

1. See E. McClung Fleming, "Artifact Study: A Proposed Model," *Winterthur Portfolio* 9 (June 1974): 153–61, and Thomas J. Schlereth, ed., *Material Culture Studies in America* (Nashville: American Association for State and Local History, 1981).

2. Ghislaine Lawrence, "The ambiguous artefact: Surgical instruments and the surgical past," in *Medical theory, surgical practice: Studies in the history of surgery*, Wellcome Institute Series in the History of Medicine, ed. Christopher Lawrence (London and New York: Routledge, 1992), pp. 295–314. Other useful works are described in the Bibliography following this article.

3. *Nineteenth Century Surgical Instruments: A Catalogue of the Gustav Weber Collection at the Howard Dittrick Museum of Historical Medicine* (Cleveland: Cleveland Health Science Library, 1986).

4. Audrey B. Davis, "Historical Studies of Medical Instruments," *History of Science* 16 (1978): 107–33.

5. "Charles Truax, *The Mechanics of Surgery*, and the development of the American surgical instrument industry."

6. James M. Edmonson, "Aesepsis and the Transformation of Surgical Instruments," *Transactions & Studies of the College of Physicians of Philadelphia*, ser. 5, 13 (1991): 75–91.

7. This misconception applies to a broad range of products, I have learned. When mention is made of fine timepieces, for example, we immediately think of the German-speaking Swiss; in fact, the fine watch and chronograph industry was centered in traditionally French-speaking cantons of Switzerland. See David S. Landes, *A Revolution in Time: Clocks and the Making of the Modern World* (Cambridge: Belknap Press of Harvard University Press, 1983).

8. "The American surgical instrument industry, 1880–1916: The impact of European importation and asepsis," *Proceedings of the Sixth Symposium of the European Association of Museums of History of Medical Sciences . . . 1992* (Leiden: Boerhaave Museum, 1992).

9. "Paul Henger, of Stuttgart, Germany. Surgical instrument. Specification forming part of Letters Patent No.474,130, dated May 3, 1892."

10. See William D. Noonan, "Patenting Medical Technology," *Journal of Legal Medicine* 11 (1990): 263–319.

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Cid, Felipe. "Medical Instruments: A New Element in the Study of the History of Medicine." In *Actes du 2eme Colloque des conservanteurs des musees d'histoire des sciences medicales . . . 1984* (Proceedings of the Second Symposium of the European Association of Museums of History of Medical Sciences . . . 1984). Paris: Collection Fondation Marcel Merieux, 1984. Explores the challenge of using artifacts in museum collections to gain new insights into the medical past.

Connor, J. T. H., and Jennifer Connor. *The Artifacts and Technology of the Health Sciences: A Bibliographic Guide to Historical Sources.* London, Canada: University Hospital, 1987.

Davis, Audrey B. "American Medicine in the Gilded Age: The First Technological Era." *Annals of Science* 47 (1990): 111–25. Seeks to explain how American medicine became wedded to technology, more so than in any other society; Davis's insights are derived from prior study of instrument collections.

_____. "Historical Studies of Medical Instruments." *History of Science* 16 (1978): 107–33. First comprehensive review of the literature.

_____. *Medicine and Its Technology: An Introduction to the History of Medical Instrumentation.* Westport, Conn.: Greenwood Press, 1981. Historical monograph based upon study of artifacts; not only documents the use of diagnostic instrumentation but also assesses the social impact of that development.

Edmonson, James M. "The American surgical instrument industry, 1880–1916: The impact of asepsis and European importation." Forthcoming in *Actes du Colloque des conservateurs des musees d'histoire des sciences medicales . . . 1993.* Contends that factors in instrument design and manufacture spelled the demise of the American instrument industry.

_____. "Asepsis and the Transformation of Surgical Instruments." *Transactions & Studies of the College of Physicians of Philadelphia,* ser. 5, 13 (1991): 75–91. Identifies, from artifactual sources, the nature of the changes wrought by the diffusion of the germ theory; contends that these changes heralded the demise of instrument making in the United States.

_____. "Charles Truax, *The Mechanics of Surgery,* and the Development of the American Surgical Instrument Industry." Introduction to reprint of the 1899 edition of Charles Truax, *The Mechanics of Surgery.* San Francisco: Norman Publishing, 1988. Examines the relationship of instrument makers and their surgeon patrons, particularly their collaboration in the design process.

_____. *Nineteenth Century Surgical Instruments: A Catalogue of the Gustav Weber Collection at the Dittrick Museum of Historical Medicine*. Cleveland: Cleveland Health Sciences Library, 1986. Catalogue presented to document the range of surgical procedures performed in the nineteenth century.

_____ and F. T. Hambrecht. "George Tiemann & Co., the *American Armamentarium Chirurgicum*, and the American Surgical Instrument Trade." Introduction to reprint of the 1889 edition of George Tiemann & Co., *American Armamentarium Chirurgicum*. San Francisco, Norman Publishing, 1989. History of America's most distinguished instrument maker, with discussion of materials and methods for identifying and dating instruments.

Goler, Robert I. "Visual and artifactual materials in the history of early American Medicine." *New York State Journal of Medicine* 87 (1987): 14–22. Explores how artifacts revealed the workings of medicine in everyday society; laments that inaccessibility hampers scholarly study of artifacts.

Haubrich, Christa. "The Emergence and Development of Collections of Medical Objects in Germany and Their Influence on Research in Medical History." In *Actes du 2eme Colloque des conservateurs des musees d'histoire des sciences medicales . . . 1984* (Proceedings of the Second Symposium of the European Association of Museums of History of Medical Sciences . . . 1984). Paris: Collection Fondation Marcel Merieux, 1984. Documents the use of artifacts in medical history research.

Howell, Joel, ed. *Technology and American Medical Practice, 1880–1930: An Anthology of Sources*. New York: Garland Publishing, 1988.

Kirkup, John R. "The history and evolution of surgical instruments." *Annals of the Royal College of Surgeons of England* 63 (1981): 279–85; 64 (1982): 125–32; 65 (1983): 269–73; 67 (1985): 6–60; 68 (1986): 29–33. Succinct overview of instrument development, based upon both artifacts and literature, reasons by analogy in discussion of primitive instrumentation.

Kuhn, Walther, and Ulrich Trohler, eds. *Armamentarium obstetricium Gottingense* (A Historical Collection of Perinatal Medicine). Gottingen: Vandenhoeck & Ruprecht, 1987. Catalogue of instruments, analyzes the development of eighteenth- and nineteenth-century obstetrics through artifacts; essentially superficial, alas.

Lawrence, Christopher. "Incommunicable Knowledge: Science, Technology and the Clinical Art in Britain, 1850–1914." *Journal of Contemporary History* 20 (1985): 503–20. Examines, in light of the author's prior study of artifacts in the Wellcome Museum, the ambivalent British response to new medical technology in the nineteenth century.

_____. "Physiological apparatus in the Wellcome Museum." *Medical History* 22 (1978): 196–200; 23 (1979): 96–101. Study of museum objects to determine the extent to which they were incorporated into clinical practice.

_____ and Ghislaine Lawrence. *No Laughing Matter: Historical Aspects of Anaesthesia. Catalogue of an exhibition held at the Wellcome Institute for the History of Medicine 8 June to 25 September 1987*. London: Wellcome Institute for the History of Medicine/Science Museum, 1987. Innovative exhibit catalogue, examining not only the narrative technical history of anesthesia but also such issues as the historical debates over its discovery, the social and cultural determinants of the way in which

anesthesia was used, and the position of the anesthetist vis-à-vis other surgical specialties.

Lawrence, Ghislaine. "The ambiguous artefact: Surgical instruments and the surgical past." In *Medical theory, surgical practice: Studies in the history of surgery*, Wellcome Institute Series in the History of Medicine, edited by Christopher Lawrence. London and New York: Routledge, 1992. Insightful analysis of the ways in which artifacts have (or haven't) been studied; emphasizes the complexity of instruments as historical sources.

National Library of Medicine. *Index-Catalogue of the Library of the Surgeon-General's Office*. 1880–1932.

Reiser, Stanley Joel. *Medicine and the Reign of Technology*. Cambridge, England: Cambridge University Press, 1978. Landmark study of medical instrumentation, demonstrating how new diagnostic technology altered the traditional physician-patient relationship, responsible for stimulating exploration of museum collections by medical historians.

Wellcome Institute for the History of Medicine. *Subject Catalogue of the History of Medicine and Related Sciences*. Munchen: Kraus International Publications, 1980.

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Chicago Surgical Instrument Makers, 1855–1899: A Directory of Makers and Commentary on Historical Sources

The insights of social historians and scholars of material culture have dramatically widened the scope of inquiry into medical history. Especially useful have been studies on how the experiences of ordinary people can be examined by using contemporary documents that recorded daily events.[1] The compilation and dissemination of detailed source materials—from court records to store ledgers—have enabled researchers to begin exciting new avenues of inquiry.

As a result of these inquiries, historians of medicine now have benefitted by new standards from which to establish quantifiable information for surviving instruments. Artifactual materials have become "sources of ideas" for further historical investigation.[2] Inquiries may include comparisons of regional traits, documentation of specific developments within a region, and even the spread of new technologies and procedures. Such approaches also may help curators and other museum professionals to evaluate current holdings and to establish criteria for new acquisitions.

Sharp & Smith set of Roler's Obstetrical Forceps. The instrument is nickel-plated and finished with ebony handles.

(Courtesy of The Pearson Museum)

Background

Recent publications have begun to investigate the material culture of medical history. In general, those works document individual artifactual forms, survey a particular firm, or document a specific phenomenon.[3] Another approach has been to sketch the history or evolution of an instrument's design or use.[4] Important contributions to those efforts have been the reprinting of original

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sources—such as diaries, trade catalogs, and analyses of medical records.[5] Authors of such works have begun the important task of sketching in the details of the broad canvas of medical history, thus making future research endeavors easier and more valid. To date, however, scant attention has been given to the particulars of the surgical instrument industry.

The issue of dating historical instruments has been complicated by a lack of sources. Existing studies focus primarily on European makers.[6] The need to develop primary documentation for American surgical instrument makers is an important component of the overall development of an increasingly sophisticated historical program for American medicine and industry. Such efforts, while detailed in themselves, are crucial groundwork for future investigations; for comparison, the advance of critical knowledge in the decorative arts was substantially facilitated by the compilation of studies of makers' marks.[7] A forthcoming study of nineteenth-century American surgical instrument makers will address that important need on a national scale.[8] The present text is offered as a small example of the value to be derived from a comprehensive national directory.

Accurate identification and dating of historical objects is fundamental to the study of material culture as raw data from which critical evaluation of daily experience, transfer of information, and creativity can be determined.[9] Instruments are extremely significant because many of them were used over extended periods of time or because different

Undated advertisement for* Dr. Kline's Obstetric Slipper, *manufactured by Haussmann, McComb & Dunn. The 1886 Chicago city directory first lists this manufacturer of "Surgical and Veterinary Instruments, Deformity Apparatus, Etc." at 122 Randolph. After 1891 it moved to another location.

(Courtesy of the Chicago Historical Society)

forms of similar instruments were used simultaneously.[10] Individual practitioners with preferences for specific instruments certainly continued to use them after the introduction of new, improved models; furthermore, all forms of instruments may not have been equally available to all practitioners, nor were they necessarily purchased if an instrument already owned by the practitioner would serve the intended purpose. These situations probably created a dichotomy between technological progress and practice. Documenting the

use of specific instruments at particular locations and points in time may present intriguing insights into the practices of individual healers. In addition, systematic examinations of advertisements and broadsides can either suggest specific artifacts that would be important additions to existing collections or would give new meaning to unassuming objects.

Chicago is an appropriate place in which to begin the effort. That great city has long been associated with the critical developments in American urban history and may accurately be seen as a barometer of American industry and attitudes.[11] The rapid growth of the metropolis from its formal incorporation in 1833 through the nineteenth century paralleled the development of a popular conception of the value of creating institutions. While that self-conscious, culture-making quality of Chicago was not unique, the extraordinary growth of the city during the second half of the nineteenth century to become the nation's second most populous city gave rise to an extraordinarily vibrant metropolis. Between 1850 and 1900, Chicago's population increased nearly *sixty times* from 29,963 to 1,698,575, prompting Rudyard Kipling to describe the city as "a splendid chaos."[12] Such growth was unprecedented in American history and paralleled the formation of a strong medical community.

Medicine in Chicago

For Chicagoans in the nineteenth century, the creation of a medical profession was an important element of modern life.[13] The city has been characterized as the leading commodities center of the Midwest, the nexus of trade to the western lands, and a contributing force to the expansion and cultivation of the West.[14] That bustling pace also brought disorders and difficulties, prompting one observer to characterize Chicago as "the most American of American cities, and yet the most mongrel."[15] Those qualities were particularly valuable in establishing the city's industrial base; moreover, they provided a wide market for those who manufactured and sold surgical instruments and therapeutic apparatus. During the 1890s, when Chicago's buildings gained international renown, the city directories included many more listings of prosthetic manufacturers than architects.

Concerns about the importance of medical affairs surfaced early in the development of the city and soon were a regular component of the urban intellectual landscape. A Board of Health was established in 1863 (and reorganized as a Health Department in 1876); societies were created for physicians and surgeons; and numerous asylums, charitable organizations, hospitals, and infirmaries opened their doors.[16]

Chicago's medical community benefited in the second half of the nineteenth century from an active and diverse range of medical publications. No fewer than sixteen periodicals began publication during those decades; they included not only allopathic, homeopathic, ecletic, and physiomedical perspectives but also reports of pathological observations and descriptions of specialized surgical procedures.[17] As the century ended, the city's role as a regional and national

leader in medical publishing was firmly established.[18] The Chicago medical community provided a fertile ground for surgical instrument makers.

City Directories as Sources

In Chicago, the systematic publication of directories soon after the establishment of the city provides an important and virtually complete resource, one that reflects the importance that residents placed upon the formal institutions of communal life.[19] City directories are a valuable historical resource for investigating business and industrial history.[20] As little scholarly work has been published on the surgical instrument industry in Chicago, it is important to begin compiling and disseminating material that will facilitate such assessments. The first directory, published just six years after the city's incorporation, was a small pocket-sized volume with thirty-five pages; by the end of the century, the directory had grown to the size of a modern telephone book and numbered more than two thousand pages.

"A Directory of Chicago Surgical Instrument Makers, 1855–1899," which follows this essay, was compiled from city directories spanning nearly a half century of the city's growth. The directories include the names, address, and business activities for each firm. Businesses with only partial involvement in the surgical instrument business were included to provide a more comprehensive resource for artifact identification. As a result, firms specializing in equipment for aural, dental, prosthetic, and veterinary material appear beside those whose principal interest was surgical instruments. While the Directory is intended as comprehensive, not all firms operating in Chicago during the period were included in city directories nor were listings necessarily given every year for each firm after an initial appearance. In addition, firms that only marketed other makers' instruments, or to whom such devices were a small proportion of their operation (such as Sears, Roebuck & Co. or Montgomery, Ward & Co.) were not included. Nevertheless, the Directory can be a powerful tool in expanding the historical record for artifacts. An example of that approach would be to determine the date of manufacture for a particular artifact. Information in city directories also can

TABLE 1
Establishment of Chicago Surgical Instrument Firms, 1855–1899

Decade	Number of Firms	Rate of Change
1850s	5	nc
1860s	4	−20%
1870s	14	+250%
1880s	17	+21%
1890s	39	+129%

SOURCE: Chicago city directories, 1855–1899.

NOTE: Only one entry has been compiled for each firm, marking the year in which it first appeared in the city directories. New entries were recorded for renamed and reorganized firms only when they immediately relocated; these include Bliss and Torrey (1872), Bliss (1877), Degenhardt (1869), E. H. Sargent (1877), Tolle and Degenhardt (1862), and Wilkins (1897).

TABLE 2
Total Number of Chicago Surgical Instrument Firms, 1855–1899

Decade	Number of Firms	Rate of Change
1850s	5	nc
1860s	6	+20%
1870s	16	+167%
1880s	22	+50%
1890s	45	+105%

SOURCE: Chicago city directories, 1855–1899.

NOTE: Entries were compiled for each decade in which an individual firm appeared in the city directories. As in Table 1, a firm was considered to be in continuous operation until it was simultaneously renamed and relocated.

aid researchers in examining such broader social questions as the relation between an industry and population patterns.

The Directory provides new insight into the business of surgical instrument making and suggests avenues for further research. A total of seventy-four firms were identified; five were listed in 1855, and over time new firms appeared (Table 1). Two anomalies can be seen in the progression: the dramatic increases in the number of firms established in the 1870s (250%) and the 1890s (129%). Further investigation of those two periods against the historical record for Chicago demonstrates how city directories can illuminate general historical trends.

The unusual jump in the number of firms established in the 1870s is the result of larger urban shifts that followed the Great Fire of 1871. It is clear from the directories that the vast majority of instrument makers were located within the central business district, an area that was devastated in the Fire. While a total of nine firms had set up shop in Chicago in the sixteen years preceding 1871, just two firms appear to have been active on the eve of the Fire: Bliss and Sharp, and Charles Degenhardt. Both firms reopened after the conflagration, but not without significant changes.

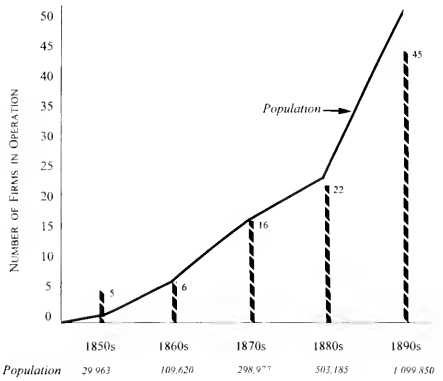
Sylvester Bliss parted with his partner and joined forces with T. F. Torrey; just four years later, Torrey would leave and establish a competitive firm. Bliss's former partner established Sharp and Smith, a firm that became one of the most prosperous in the city. Degenhardt's firm experienced less change in personnel, but did relocate to a site a few blocks away on Madison Street. And perhaps to diminish the risk of another calamity, Degenhardt opened a second office at another location in the Loop. The resurgence of Chicago after the fire attracted new residents and saw an enormous expansion in the city's business; by the end of the decade, twelve additional surgical instrument firms had opened their doors.

The explanation for the large increase in surgical instrument makers in the 1890s may be found by assessing the overall scale of operations of surgical instrument firms during the decade. From the Directory it is possible to determine how long each firm remained in business. In that way, the existence of a firm is reflected in each decade of its activity and one can track the overall number of firms that operated at any

particular time. That approach provides a more accurate reflection of the ongoing diversity of the surgical instrument business in the city over time than can be extracted from the information presented in Table 1. The resulting figures demonstrate a pattern of continuous growth through the 1855–1899 period (Table 2). Analyzing the information in different ways gives a researcher the possibility of investigating trends and developments beyond the specifics of the surgical instrument industry. A comparison of the resulting information against the general population figures for Chicago, for example, shows that the surgical instrument industry grew in direct proportion to population changes, a trend that was particularly dramatic during the final two decades of the century.

Such parallels, while provocative, also raise many questions. Is the time frame of a decade, in fact, the most useful periodization by which to categorize industrial development? It certainly facilitates comparison with population figures, but would not divisions corresponding with developments in the city, or advances in medical technology suggest equally significant perspectives? Would a different analysis of census data illustrate whether certain ethnic groups were more involved than others in the production of surgical instruments? How closely does the number of firms relate to the volume of surgical instrument production? What comparisons can be made to other cities and countries? How was information about new instruments communicated? What were the extent of markets from individual cities, and can those boundaries be correlated with transportation networks, dissemination of knowledge, or population shifts? The available information does not provide simple answers.

Number of Chicago Surgical Instrument Firms and General Population, 1855–1899



SOURCE: Chicago city directories, 1855–1899; United States Bureau of the Census population figures for Chicago in 1850, 1860, 1870, 1880, and 1890, as cited in *The World Almanac and Book of Facts . . . 1929* (New York: New York World, 1929), p. 300.

NOTE: While the city expanded physically in this period, the industrial sector of the metropolis was unchanged, suggesting that the markets for surgical instrument makers also increased.

Conclusion

It is hoped that the Directory will encourage curators, collectors, and historians to explore the specific details of the instruments in their care, and to create documentary and interpretive records that reflect critical information. In time, as records of surgical instrument

makers in other cities become available, historians may be better positioned to evaluate the development of American medical technology. It would then be possible to assess fully the contribution of Chicago's industrious energy to the development of surgical instruments.

■

Notes

1. The trend can be traced to the work of a group of French historians known as "Annalistes," named for the publication of their work in the journal *Annales d'histoire, économiques et société;* examples of their works on medical subjects can be found in Robert Forster and Orest Ranum, eds., *Biology of Man in History: Selections from the Annales, Économies, Societés, Civilisations,* trans. Elborg Forster and Patricia Ranum (Baltimore: Johns Hopkins University Press, 1975). More recent contributions to this trend are Philippe Ariès and Georges Duby, eds., *A History of Private Life,* trans. Arthur Goldhammer, 5 vols. (Cambridge: Harvard University Press, 1987–1991) and Robert Darnton, *The Great Cat Massacre* (New York: Basic Books, 1984).

2. For comments by museum professionals, see Cary Carson, "Doing History with Material Culture," and Arlene M. Palmer, "Through the Glass Case: The Curator and the Object," in *Material Culture and the Study of American Life,* ed. Ian M. G. Quimby (New York: W. W. Norton, 1978), pp. 41–64, 219–44.

3. One of the leading proponents of those efforts has been Audrey Davis; see, for example, *Medicine and Its Technology: An Introduction to the History of Medical Instrumentation* (Westport, CT: Greenwood Press, 1981) and, with Mark S. Dreyfuss, *The Finest Instruments Ever Made: A Bibliography of Medical, Dental, Optical, and Pharmaceutical Company Trade Literature, 1900–1939* (Arlington, MA: Medical History Publishing Associates, 1986).

4. Examples of that approach are Audrey Davis and Toby Appel, *Bloodletting Instruments in the National Museum of History and Technology* (Washington, DC: Smithsonian Institution Press, 1979), and J. R. Kirkup, "The history and introduction of surgical instruments," *Annals of the Royal College of Surgeons of England* 63 (1981): 279–85; 64 (1982): 125–32; 65 (1983): 268–73; and 67 (1985): 29–33.

5. Important examples are Charles Truax, *The Mechanics of Surgery* (1899; rpt. San Francisco: Norman Publishing, 1988); J. Worth Estes, "Patterns of drug use in colonial America," in *Early American Medicine: A Symposium,* ed. Robert I. Goler and Pascal James Imperato (New York: Fraunces Tavern Museum, 1987), pp. 29–37; and Laurel Thatcher Ulrich, *A Midwife's Tale: The Life of Martha Ballard, Based on Her Diary, 1785–1812* (New York: Knopf, 1990).

6. An important example is the "Directory of surgical instrument makers" in Elisabeth Bennion, *Antique Medical Instruments* (London: Sotheby Parke Bernet, 1979), pp. 304–42. Additional information can be found in Gerard L'E. Turner, *Nineteenth-Century Scientific Instruments* (Berkeley: University of California Press, 1984). Specific aspects of the issue related to medical history are discussed in Robert I. Goler, "Visual and artifactual materials in the history of early American medicine," *New York State Journal of Medicine* 87 (January, 1987): 21–22.

7. See, for example, Carl Jacobs, *Guide to American Pewter* (New York: McBride Co., 1957) and "American Silversmiths' Marks" in Seymour B. Wyler, *The Book of*

Old Silver . . . with All Available Hallmarks (New York: Crown Publications, 1937), pp. 271–324. For the history of hallmarks, see John Fleming and Hugh Honour, *Dictionary of the Decorative Arts* (New York: Harper & Row, 1977), pp. 363–64.

8. James M. Edmonson, "Surgical Instrument Makers in Nineteenth-Century America" (in preparation).

9. Recent works that have benefitted from the approach are Thomas J. Schlereth, *Victorian America: Transformations in Everyday Life, 1876–1915* (New York: HarperCollins, 1991) and Henry Petroski, *The Evolution of Useful Things* (New York: Knopf, 1992).

10. James Edmonson, "Introduction," in Truax, *The Mechanics of Surgery*, pp. viii-ix.

11. For a summary of the historiography on Chicago, see Frank Jewell, comp., *An Annotated Bibliography of Chicago History* (Chicago: Chicago Historical Society, 1979). Recent literature is surveyed in Ann Durkin Keating, "Urban History in the Windy City," *Journal of Urban History* 18 (1992): 504–9.

12. United States Bureau of the Census population figures, cited in *The World Almanac* (1929), p. 300; Rudyard Kipling, *American Notes* (Boston: Brown and Company, 1899), p. 91. For an overview of the development of Chicago, see Harold Mayer and Richard Wade, *Chicago—The Growth of a Metropolis* (Chicago: University of Chicago Press, 1973).

13. For an overview, see Thomas Neville Bonner, *Medicine in Chicago, 1850–1950*, second edition (Urbana: University of Illinois Press, 1991).

14. William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton & Co., 1991).

15. G. W. Steevens, *Land of the Dollar* (New York: Dodd, Mead and Co., 1897), pp. 144–45.

16. See *The Chicago Medical Register and Directory* (Chicago, 1872–1876).

17. *Index-Catalogue of the Library of the Surgeon General*, first series, 2 (1881): 933–35; second series, 3 (1898): 417–20; third series, 3 (1922): 1066–67.

18. One such example was the *Omaha Clinic*, which relocated to Chicago in its tenth year of publication and was renamed *Chicago Clinic: A Monthly Journal Devoted to the Medical Profession of the Middle West*.

19. For a full discussion of the efforts to create "civilizing" institutions in Chicago during the nineteenth century, see Helen Lefkowitz Horowitz, *Culture in the City* (Louisville: University Press of Kentucky, 1976).

20. For more information on the use of city directories, see *City Directories of the United States, pre-1800 through 1901* (Woodbridge, CT: Research Publications Inc., 1984). One work specifically focusing on Chicago sources is *Chicago Photographers . . . as listed in the Chicago City Directories* (Chicago: Chicago Historical Society, 1958).

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A Directory of Chicago Surgical Instrument Makers, 1855-1899

Compiled by Robert I. Goler and Casey Riley

Allison, W. D. Co.
1893–1894: 1530 Masonic Temple
1895–1899: 1101, 204 Dearborn

Bailey, John
1888–1889: 231 Armitage Ave.

Baird Bros.
1899: 73, 120 Madison

Bartlett & Butman
1885–1886: 83 Randolph

Bitting, L. C.
1880: 2, 112 Randolph

Bliss & Sharp; Bliss & Torrey; Bliss, Sylvester S.

Bliss & Sharp
1864–1870: 144 Lake
1871: 105 State

Bliss & Torrey
1872: 25 Market
1873: 171 and 173 Randolph

Bliss, Sylvester S.
1877–1880: 70 State
1881–1883: 79 Randolph
1884: 26, 89 Randolph
1885: 69 Randolph
1886: 68 Randolph
1891–1893: 79 Randolph
1894: 26, 89 Randolph
1895: 69 Randolph
1896: 68 Randolph

Bonte, Philipp
1885: 218 Washington
1886: 111 Fifth

Brown, George H.
1877–1878: 32 W. Quincy
1879: 181 S. Clinton
1895: 724 Morse

Cantrell, W. B.
1899: 527, 84 Market

Carliczek, Ottomar
1897: 56 Dearborn
1899: 908, 109 Randolph

Chaim, Adolph
1888–1889: 70 Madison and 448 Milwaukee Ave.
1890: 11 and 12, 70 Madison

Chicago Homeopathic Pharmacy (Halsey Bros. Proprs.)
1873: 72 State

Corbridge, J.
1855–1856: 197 Randolph

Crowfoot, August; Crawfort, August; Crawford (*See also* Spicker & Crawfort)

Crowfoot, August
1894: 8, 196 Clark

Crawfort, August
1895: 8, 196 Clark

Crawford
1896: 8, 196 Clark
1899: 527, 84 Market

Crown Acoustic Co.
1894: 605, 59 Clark

Dawson, James W.
1877–1878: 1, 31 S. Canal
1878–1879: 9, 13 S. Canal
1879: ss. Evergreen av. nr. Myrtle av.

Degenhardt, Loewe & Co.; Degenhardt, Charles

Degenhardt, Loewe & Co.
1861–1862: 130 Clark

Degenhardt, Charles
1868–1870: 125 LaSalle
1871: 124 LaSalle
1872–1875: 510 and 512 W. Madison, Branch Office, 426 State
1875–1879: 75 Fifth

Drake & Mueller
1897–1899: 266 Ogden

Edgerton, Edward E.
1878: 125 State
1879: 40 Washington

Ellacott, Joseph P.
1881–1882: 10 Ogden Bldg., 38 Clark

Ellwood Ivins Tube Co.
1897: 318 Royal Ins. Bldg.

Fenner, Irvin R.
1885–1886: 7, 89 Randolph

Frank, Anton A.
1899: 56 Dearborn

Frank & Kratz-Mueller
1894–1897: 56 Dearborn

Freeman, Sheldon C.
1894: 20, 139 Madison

Gibbs Respirator Co.
1893–1894: 601, 36 LaSalle

Hainz, Chas.
1899: 943 S. Troy

Halsey, W. D.
1878–1879: 27 Washington
1882: 46 S. Clinton

Hart, Charles A.
1880: 6 Calhoun Place

Harvard Co.
1891–1892: 200 Oakwood Blvd.

Haussmann, H. & Co.
1885: 53 W. Lake
1886: 113 to 119 Michigan

Haussmann, McComb & Dunn
1886–1891: 122 Randolph
1892: 213 Madison
1893–1894: 211–213 Madison
1895–1897: 111 Madison
1899: 107 S. Clark

Hayes Dental & Surgical Mfg. Co.
1890: 24, 195 State
1893: 103 Randolph

Heinemann, Theo W.
1885: 69 Lake
1892: 34 W. Monroe

Heyer Storage Co.
1899: 88 to 92 W. Jackson

Hoehn, R. & Co.
1896: 306, 52 Dearborn

Hradecky, Frank
1896: 1915 W. Forty-seventh
1897–1899: 4525 Honore

Huston Bros.
1890: 112 S. Peoria
1894: 127 Clark
1895: 71, 125 Clark
1896–1897: 60, 125 Clark
1899: 410, 413 Adams

Johnson, Sigfried
1894: 196 Clark

Jones, White & McCurdy
1859–1860: 102 Randolph

Karlson, Karl E.
1894: 196 Clark
1895–1896: 8, 196 Clark
1897: 148 Clark

Kehoe, James; Kehoe & Kelsey

Kehoe, James
1873: 253 S. Canal

Kehoe & Kelsey
1874–1875: 249 and 251 S. Canal

Koeber, Edward
1896–1899: 2449 State

Korecek, Joseph
1894: 484 W. Eighteenth

Kretchmar & Englich Co.
1899: 63, 125 Clark

Lee J. Ellwood Co.
1889: 315 to 321 Wabash
1896–1897: 529, 204 Dearborn

Mabon, A.
1867–1868: 149 Wells
1868: 182 Madison

McIntosh's, Dr., N. U. Supporter Co.
1877–1878: 296 W. Lake
1879: 192 and 194 Jackson
1886: 300 Dearborn

Metal Novelty Works, Henry Carstens
1890: 261 Randolph
1893–1894: 28 and 30 Market
1896: 32 Market
1897: 460, 32 Market
1899: 28 to 32 Market

Miller, O. E., Hernia Treatment Co.
1893: 1106 Masonic Temple

Niehans, August
1887–1888: 7 and 8, 89 Randolph
1889: 12, 89 Randolph

Norlin, Frederick
1892: 84 Market
1893–1894: 196 Clark
1899: 5, 199 Clark

Parker & Wilkins Mfg. Co.
1893–1894: 304, 96 State

Physicians Co-operative Supply Co.
1897: 611, 56 Fifth Ave.

Reed, J. H. & Co.
1859–1862: 144 and 146 Lake

Reynders, John & Co.
1881–1883: 56 Randolph

Ringle, Lafayette
1895: 7747 Greenwood

Sanitary Appliance Co.
1884: 110 Clybourne
1887: 125 State

Sargent, Ezekial H.; Sargent, E. H. & Co.

Sargent, Ezekial H.
1874–1875: 785 Wabash Ave.

Sargent, E. H. & Co.
1877–1892: 125 State
1893–1895: 106 and 108 Wabash
1896–1897: 106 Wabash

Shannon, James S.; Shannon, W. D.
1878–1879: 27 Washington
1881: 29 Washington

Sharp & Smith
1876–1882: 100 Randolph
1883–1899: 73 Randolph
1897: 76 *[sic]* Randolph

Sparenburg, John
1896–1897: 6156 S. Carpenter

Spicker & Crawfort (*See also* Crawfort, August)
1891: 197 S. Canal

Swinbourn, W. H.
1891: 30 VanBuren

Tate, Charles L.
1885–1886: 26, 89 Randolph

Tolle & Co.; Tolle, Geo. & Co; Tolle & Degenhardt (*See also* Degenhardt, Charles)

Tolle & Co.
1855–1856: 87 Clark

Tolle, Geo. & Co.
1856–1857: 87 Clark

Tolle & Degenhardt
1862–1865: 130 Clark
1865–66: 131 LaSalle
1866–1868: 125 LaSalle

Torrey & Bradley; Torrey, T. F.
1876–1877: 171 and 173 Randolph
1877–1878: 173 Randolph

Truax, Chas. & Co.; Truax, Chas., Greene & Co.

Truax, Chas. & Co.
1884–1886: 81 Randolph
1887–1888: 75 and 77 Wabash
1889–1891: 75 Wabash

Truax, Chas., Greene & Co.
1891–1899: 75 and 77 Wabash

Turner & Medill
1891: 713 W. VanBuren

Wales, H. A. Co.
1894–1895: 605, 59 Clark
1896: 909, 59 Clark
1897–1899: 1414 Masonic Temple

Welch, Henry W.
1899: 201, 56 Fifth

Whitcomb, James O.
1855–1856: 36 Dearborn
1856–1857: Corner Lake and Clark

Wilkins, J. N. & Co.; Wilkins Mfg. Co.

Wilkins, J. N. & Co.
1891: 32 Market

Wilkins Mfg. Co.
1897: 604, 167 Dearborn
1899: 508, 92 State

Wolfertz, Robert
1893: 187 Clark

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Casey Riley teaches at the Brearley School in New York City. She worked on this project while serving as a Research Assistant in the Department of Decorative and Industrial Arts at the Chicago Historical Society. She also has held positions at the Yale University Art Gallery.

Steel Knives and Iron Lungs: Medical Instruments as Medical History

Any medical museum curator will tell you that there are great voids in our knowledge of medical instruments. Even though these objects have been carefully passed down from generation to generation, we cannot determine with certainty how many of them were used, when they were used, or even for what procedures they were used. At the Mütter Museum we have drawers full of instruments that we cannot identify through any reference book, manufacturer's catalogue, or even "Highlights of the Development of ——" publications. The instruments are simply what doctors actually used. The fact that they exist is often the only available documentation of their existence.

There are wonderful opportunities for historical research in collections of medical artifacts. The challenge is getting that message across to people who have read or written about medical history without considering the artifacts and mistakenly think that they are getting the whole story. The medical artifacts themselves can often speak as powerfully as written explanations.

Medical instruments often have the power to evoke an emotional response just by their very presence and the associations they have for the viewer, even if it is for the wrong reasons. The long shiny knives in a Civil War period amputating set, for example, have been the stuff of nightmares. The threat of them drove Kevin Costner off the operating table in *Dances with Wolves*, hobbling away to let nature heal his fractured leg rather than having it cut off by Civil War surgeons. Actually, those razor-like catlin knives, sharpened on both sides, were intended to guarantee the fastest circumnavigation of the leg or arm possible at the time and thus minimize the patient's stress.

The ebony handles on the knives, however, were far more dangerous than the blades. They tell us that the surgeons didn't know about bacterial infection and its control by chemical and heat sterilization, processes that would ruin those beautiful wood and ivory handles. It was not the shiny steel blades but the innocuous-seeming handles (reflecting an ignorance of germ theory) that posed the real danger.

A 1949 Emerson iron lung in the Mütter Museum elicits an interesting array of reactions, largely depending on the age of the viewer. For persons with memories of the polio epidemics of the

by Gretchen Worden

1950s, the machines represent the fear and pain of friends and family. To a younger generation protected by vaccines, iron lungs may have been the subject of jokes—they lined up to take shots or sugar cubes of vaccines, but they'd never seen a real iron lung. Younger Mütter visitors, who may not even have heard of polio, regard the iron lung with a curious stare that changes to a horrified gaze as they learn what it was all about.

Comic but equally educational are the astounded "They put that *where?*" reactions of visitors who eye the enormous vaginal specula, urethral sounds, and long brass bronchoscopes on display.

All medical museum curators can attest that the actual object stimulates the imagination and provides the nearest thing to the actual experience of what it was like to use the instruments (or have them used on us). Written descriptions—or even photographs—simply cannot convey the message. The objects can also show us the sometimes surprising ways in which instruments develop over time.

Understand and Deliver

Obstetrical forceps are an excellent example of the nonlinear progression of technology in relation to technique that characterizes so many medical (and other) inventions.

In 1953, L. V. Dill estimated that although more than six hundred pairs of forceps had been described since the 1700s, there were only about sixty fundamentally different ways to design the blades, shanks, locks, and handles. Practically speaking, there is a reason for a certain number of variations in forceps—no single design is going to fit all women's pelves, all babies' heads, all presentations, all stages of birth, and all obstetricians' hands and strength. Also, certain changes in design have occurred as physicians learned more about maternal and fetal anatomy and the mechanics of delivery. The advent of anesthesia and analgesia and the means of diagnosing fetal distress have made the use of forceps a procedure of election and prophylaxis. Dill very nicely compared forceps to "golf clubs, not to tennis racquets . . . optimum utility is obtained by a set, not by familiarity with a single favorite."[1]

A look in a 1973 catalogue of the Chicago-based V. Mueller Company shows that the following forceps were available to the obstetrician at that time (I have added their dates of invention): Simpson, 1848; Elliott, 1858; McLane, 1880; Tarnier, 1881; McLane-Tucker, 1892; DeLee, 1900; Kielland, 1915; Piper, 1924; Barton, 1925; Kielland-Luikart, 1935; and Dexeus-Kielland, 1950.[2] Contributors to that relatively modern American obstetrical armamentarium included a Scotsman, a Frenchman, a Norwegian, and several Americans.

The list is suggestive of several observations—some early designs stand the test of time; a love of tinkering has encouraged obstetricians to "improve" earlier models; progress in forceps design has been irregular over the past three hundred years; and the most re-

cently designed instruments are not necessarily the best.

The list also suggests another kind of question. Given the variety of choices, which forceps will a doctor actually use? In reality, a physician's options at any given time are limited by the number of forceps he or she knows about and the number that are readily accessible. There are national and regional differences in the assemblage of forceps produced by various companies, with a limited amount of overlap; choice therefore depends on accessible catalogs. Some forceps are manufactured for only a few years while others—such as the Simpson forceps—become accepted as standards and survive for many decades. The greatest influence, however, at least at the beginning of an obstetrician's career, may be the instruments preferred or invented by the doctor who trained him or her. This often accounts for varied patterns of forceps' use in different parts of the country, from city to city, and even from one hospital or medical school to another. Such differences are acknowledged in various books on the history and use of forceps, but little has been done to document the phenomenon.

The message that has been missed too often—with forceps, as with other instruments—is that the proper identification of an instrument is not a mere exercise in connoisseurship. It is about basic issues of tool design and a doctor's perception of them. It has to do with whether or not a given physician is using the most effective instrument for the task at hand, or if the choice was based on such considerations as familiarity, availability, or custom that may not result in the best care for the patient. These distinctions are important because they guided the people who design the tools, those who use them, and the women and babies they are used upon (as well as the lawyers who sue for malpractice on the basis of whether or not the instruments were used correctly). "Nineteenth-century obstetrical forceps—wooden handles" doesn't begin to suggest the wealth of information about the practice of obstetrics that could be gained from a thorough study of the reasons behind, and the consequences of, the more than six hundred different obstetrical forceps designs.

Instruments and the Man

Consider this thumbnail sketch of John Peter Mettauer (1787-1875). Mettauer was Virginia-born and University of Pennsylvania-trained (under Shippen, Wistar, Physick, and Rush). He founded a medical school in Virginia, and he earned for his leadership in surgical cleanliness such accolades as "facile princeps of the medical and surgical world" and "America's Own Lister."[3] He preceded Marion Sims in the repair of vesico-vaginal fistula, and he performed the first complete successful cleft palate surgery in America. Yet today Mettauer is hardly a household word, and his innovative and daring surgical work is largely unknown.

Mettauer designed and made many of his own instruments. While a number were buried with him, others are re-

These three obstetrical forceps, when photographed from above, appear very similar. They are, left to right, Hodge (1833), Bethell (1853), and Wallace (1865). All are derived from the long French forceps of Baudelocque; they have the German lock of Siebold and the shanks of Hodge.

The same three forceps, when photographed from the side, reveal major variations in the blades. Both the Bethell and Wallace are derived from a Davis blade, but with very different cranial curves.

(Courtesy of the Mütter Museum)

ported to be at his undergraduate alma mater, Hampden-Sydney College. Two sets consisting of urethral, vesico-vaginal, and cleft palate instruments, including a variety of innovative metallic sutures, found their way to the Mütter Museum.

The Mettauer pieces at the Mütter present an opportunity to study one-of-a-kind instruments made by a pioneer in American surgery. There is fresh historical ground to be broken in the study of his instruments. In the last twenty years only two people—one a cleft palate surgeon and the other a urologist—have spent any significant time examining the pieces, conjecturing about their use, and comparing them with more familiar tools. A thorough study of Mettauer's own instruments, when combined with research about his writings on surgery and his descriptions of those instruments, might result in a wider appreciation of this renowned physician's place in the history of surgery, a place that his own diffidence regarding self-promotion, and a reluctance to leave his beloved Old Dominion may have denied him.

Medical historians can exhibit a surprising lack of curiosity when given the opportunity to examine and use an instrument devised by one of the great names in medicine. Is there nothing to be learned from putting one's ear to a wooden cylinder from the lathe of Laennec, to hear what he heard? Or to put one's eye to a Jaeger ophthalmoscope, to see what he saw? Just imagine what the experience could add to one's understanding of the inventor's observations. If historians saw the value of such activities, they would be beating a path to our museum doors.

Just picking up and holding an instrument immediately tells you many things that rarely find their way into print. Such "hands-on" experience may explain why some instruments were universally accepted while others never caught on. Some instruments were extremely complicated to operate or difficult to keep clean. Expectations of progress may be confounded as well. Recently, for example, an obstetrician examining some of our older forceps was surprised to find that one of the original sixteenth-century Chamberlen models was well balanced and quite usable, whereas a popular late-eighteenth-century model offered dangerously little control.

Survival of the Fittest?

There were many well-designed instruments that never became widely used, probably due to a lack of publicity. The best instrument, like the best man, does not always win. The dynamics of regionalism in manufacture and promotion, dominance of local design and personal preference within hospital or medical school teaching faculties, personal or professional status of the inventors and their access to certain journals, all had as much or more to do with the success of an instrument as did excellence of design. At least one medical technology research company—Northern Applied Research of Miltona, Minnesota—is banking on that idea by

This volume ventilator, manufactured by the Emerson Company of Cambridge, Massachusetts, shows the ingenious use of readily available hardware to make a low-cost but eminently functional respiration therapy machine.

sending out field investigators to examine collections in museums and private institutions to see if there are worthy and commercially viable inventions that have been ignored.

A rich field of scholarly research has been similarly overlooked. Historians could trace, for example, the influence of certain physicians by seeing how the physical dispersal of their students (or articles in key journals) affected the geographic distribution of the instruments they advanced.

Looking Under the Hood

It is not only "old" instruments that have untold stories. The Mütter recently acquired an early Emerson volume ventilator, a workhorse of an instrument that was the standard in hospitals, often used for post-operative respiration therapy. On the outside, the machine is sleek—brushed metal and baked enamel—with motors and dials that look very impressive and sophisticated. But open the cabinet, and you would think you were looking under the kitchen sink. Shiny plumbing drainpipes connect to a stainless steel pressure-cooker, from which emerges a large diameter plastic tube with what looks like copper dish scrubbers inside.

I first saw the ventilator at a respiration therapy convention, as part of an exhibit on historic therapy devices. Standing beside me when the machine was opened up were a couple of experienced therapists, as well as the inventor of the machine. One of the therapists, seeing the scrubbers, said, "Oh yes, they were for bacteriostasis." To which the inventor replied, "Well, no, originally, someone had the idea of putting them in there to increase the humidity, and then we found out it was bacteriostatic." That is how machines are actually created, and yet how much of that process has ever been written down?

Swimming Lessons

Mettauer's notes on Benjamin Rush show that the most famous physician in American history admonished his students: "By visiting the sick you acquire a knowledge which cannot be described by books, as the minute variations of the pulse, changes in the countenance, voice, and excretions of the urine, etc. . . . In a word I would as soon readily believe that a man could learn to swim without entering the water, as that he could learn to cure diseases without attending to the symptoms and various circumstances connected with them."[4]

A paraphrase of Rush is in order here: By visiting the museums you acquire a knowledge that cannot be described by books. . . . In a word I would as soon readily believe that a man could learn to swim without entering the water, as that he could learn medical history without attending to the actual instruments and medicines used to practice medicine.

■

Notes

1. L. V. Dill, *The Obstetrical Forceps* (Springfield, IL: Charles C Thomas, 1953), p. 10.

2. *The Surgical Armamentarium* (Chicago: V. Mueller, 1973).

3. Mettauer founded the Prince Edward Medical Institute, which in 1847 became affiliated with Randolph Macon College. Thomas Dent Mütter, *American Medical Biographies*, ed. Howard A. Kelly and Walter L. Burrage (Baltimore: Normal Remington Company, 1920), p. 785; L. Benjamin Sheppard, "Annals of Virginia Medicine: John Peter Mettauer, 1787–1875," *Virginia Medical Monthly* 104 (1977): 457.

4. W. H. Bell, "John Peter Mettauer's notes on clinical lectures by Benjamin Rush," *Virginia Medical Monthly* 65 (1938): 354.

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Bigger than a Bread Box: Medical Buildings as Museum Artifacts

Typically, medical museum curators devote a considerable part of their professional lives to collecting and interpreting such small medical artifacts as microscopes, surgical tools, ophthalmological instruments, and so on. Interpreting the world of medicine and health care requires much more than such relatively small items, however. By casting our eyes in a wider gaze we can identify many more potential resources. In particular, I propose—even advocate—that medical museologists study buildings and similar structures *qua* artifacts, just as we have studied smaller, more easily handled objects. After all, most medical care takes place within medical buildings, whether they be homes, offices, or hospitals.

Introduction

But, of course, there are problems with this approach: rarely can one take a hospital and put it in a museum! We must find other ways of studying, cataloguing, or *interpreting* medical structures. Some form of photo documentation appears an obvious first step. Through still photography or videography, a record can be created of the structure, design, layout, and details of buildings of historical interest. The issue remains, however, of interpreting those "photo-artifacts" or, indeed, the actual structure itself.[1] Accordingly, this essay will suggest several themes, as well as the kinds of buildings or structures that illustrate each theme.

The Patient's Perspective

I further suggest that medical buildings be interpreted not only from the purely medical perspective but also from the perspective of the patient or the user. Thus, implicit throughout my argument is a social historical approach—that is, medical history from the bottom up. It should be noted that I am not discussing architectural history, which is better done by an architect or architectural historian.[2] (To be sure, though, such scholarship can be an element of my approach.)

To illustrate each of my themes, I will discuss several institutions dating from the mid-nineteenth and early-twentieth centuries, including the general hospital, the asylum, the sanatorium and other tuberculosis care sites, the octagonal dwelling, and the physician's house and

by J. T. H. Connor

office. The emphasis will be on buildings in Canada and the northern United States.

The Operating Room

Linking the traditional domain of the medical museum curator and what I advocate as a wider arena is a study of the surgical operating room and how it was affected by changing philosophies of surgical practice.

As James M. Edmonson has ably shown, the advent of asepsis had a tremendous impact upon instrument design and manufacture; of course, asepsis also had an impact upon the design and construction of operating theaters or operating rooms.[3] In pre-asepsis days, when the concepts of germs and bacterial infection were not known, surgeons might operate in almost any environment. With the introduction of antiseptic (and eventually aseptic) procedures, however, the patient's home or the kitchen table were considered less-than-appropriate places for surgery.

Accordingly, many major surgical procedures moved from the home to the hospital—and eventually into a specially designed operating environment. Typically the environment had to be easily cleaned, if not sterilized: all surfaces had to be smooth and impervious; the overall area, well-lit; and provisions had to be made for the cleansing of both patient and operating staff. Thus we can easily interpret one aspect of the hospital—the operating room—as a medical artifact in and of itself. As changing philosophies or ideologies of surgery evolved, so too did the operating room.

The General Hospital

At a broader level the hospital itself can be studied as an artifact. By looking at the institution first according to its architecture, one can often discern or identify older or original hospital structures that might be embedded within a modernized or revamped one. St. Joseph's Hospital in Ontario, Canada, is a prime example. Figure 1 is a late-nineteenth-century view of the hospital in which five arcaded windows are visible at center right.[4] Figure 2 shows the same structure in the 1990s, fairly modernized and revamped; yet the distinct fenestration can still be identified.

From a museological or interpretive point-of-view, one can often find the "old" lurking within the "new." Such an approach can afford clues to "reconstructing" historical medical buildings. More important, researchers can discern patterns of growth and change in hospital design and then relate them to such broader trends in the development of medicine as the rise of the laboratory, the movement toward private patient rooms, and so on.

A general hospital can also be interpreted with respect to the overall impact and design of its structure. Figure 3 shows the General Hospital at Parry Sound, Ontario, an old mansion—a private residence—that was converted into a hospital in the early twentieth century—not an uncommon occurrence.[5] Although today's patient might regard that structure as antiquated—if not rather eerie—and as less than hospitable, the patient of the early 1900s would see it as inviting and homey. Could not such an environment perhaps promote

health, or at least recovery, more so than a later more office-like, business-like, or factory-like structure as the Toronto General Hospital of the 1940s (fig. 4)?[6] The latter structure certainly accommodated many more "high-tech" surgical, medical, and other procedures; it was also more useable by physicians, nurses, surgeons, and other health-care workers.

But what about the patients? The long corridors, many stories, and impersonal space of the Toronto General Hospital was perhaps more intimidating than health-inspiring. Although the interpretive value of a building may be subjective, it nonetheless can provide a useful addition to analyses based on architectural significance or clinical value. Indeed, hospital architects are today (re)discovering the role of live greenery, large windows, atriums, and the possible beneficial effects of locating institutions in restful, natural settings.[7]

Other hospitals can also be interpreted as cultural or even ethnic artifacts. The mansard roof and other architectural details of the Montreal General Hospital in Quebec (fig. 5), for example, illustrates its origins within a francophone culture.[8] What, then, might be the perspective of an anglophone or Protestant patient in that environment? To what extent can we interpret the building from the patient's viewpoint, given the architectural style and the social-cultural milieu?

The concept of building-as-artifact is more easily visible and discerned in Figure 6, which depicts l'hôpital Saint Vincent de Paul of Sherbrooke, Quebec. Here, clearly, there is little room for

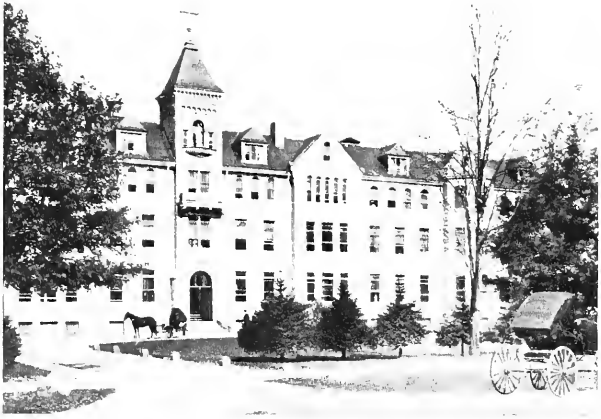

Figure 1, above, is a late-nineteenth-century view of St. Joseph's Hospital, Ontario. Figure 2, at left, shows the same structure in the 1990s, fairly modernized and revamped.

Figure 3. General Hospital at Parry Sound, Ontario, a mansion converted into a hospital

Figure 4. Toronto General Hospital in the 1940s, a factory-like structure

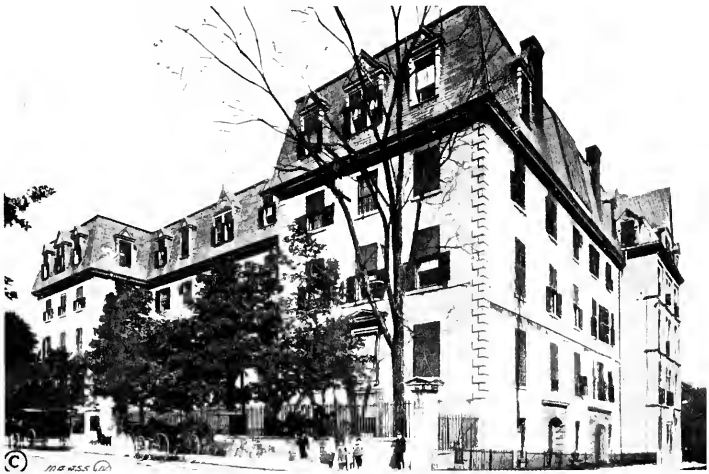

Figure 5. Montreal General Hospital, Quebec, whose mansard roof and other architectural details gave it a decidedly Gallic appearance

doubt that this is a French structure! The architecture, the external balconies, the stairways, and so on unmistakably locate the building as very much within the French idiom. For a patient of Catholic or francophone background, the style and appearance of the hospital could have a very consoling or uplifting effect; for patients of other backgrounds, however, the effect might be quite different.

Similarly, these examples remind us not to generalize the general hospital when considering its design, construction, and ambience. Moreover, as Charles Rosenberg has noted, different religious or ethnic groups often felt uncomfortable in mainstream institutions, hence the founding of Catholic and Jewish hospitals, for example, in nineteenth-century cities.[9] Considering general hospitals as artifacts, therefore, can provide corroborating evidence in support of other historical analyses that identify unique medical cultures.

The Asylum

Another institution gaining dominance at the turn of the century was the asylum, or psychiatric hospital. When viewed from a social rather than clinical perspective, the asylum can invite a fresh and different interpretation. Figure 7 shows the entrance to the asylum in London, Ontario, where the famous nineteenth-century psychiatrist Dr. Richard Maurice Bucke practiced.[10] Certainly the sylvan setting is attractive and soothing (a consciously designed aspect of many nineteenth-century asylums), but one might well wonder how a patient

Figure 6. L'hôpital Saint Vincent de Paul of Sherbrooke, Quebec, a building unmistakably within the French idiom

approaching the asylum for the first time might react.[11] Travelling along the long path could also have been perceived as an intimidating journey. One is almost drawn *into* the institution, leaving the outside world and entering a completely enclosed world—that of the asylum. Such an interpretation is strengthened when one recalls the layout of the asylums; often the buildings were massive, accommodating up to one thousand or more patients. It is not surprising to learn that in the Anglo-American world quite often the design of the asylum was similar to that of the prison.[12]

The Tuberculosis Sanatorium

Yet another common late-nineteenth-century medical structure was the tuberculosis sanatorium. In North America we can trace the origins of the sanatorium movement to Dr. Edward Livingston Trudeau—himself a tuberculous patient—who all but created a "healing industry" in the upper New York State area of the Adirondacks, specifically Saranac Lake.[13] In 1884 Trudeau built and occupied a single cottage, known as Little Red (fig. 8); from such humble beginnings the sanatorium movement blossomed.[14]

Originally the hospitals were built in sylvan settings, where trees, rivers, and fresh air were to be found in abundance.

Figure 7. Psychiatrist Richard Maurice Bucke's asylum in London, Ontario

Indeed in the village of Saranac Lake itself, an entire community developed for the treatment of tuberculosis; private dwellings were turned into health care or cure cottages that could accommodate several tuberculosis patients. Philip L. Gallos has shown in his excellent study that quite often homes were thoroughly remodeled in order to accommodate them to their new function.[15] Thus an entire culture developed where treatment, the home, the community, and the institution were blended. It is intriguing, therefore, to consider Saranac Lake as a place within the European tradition of the *éco-musée*, whereby an entire community becomes, in effect, a working museum or collection of artifacts.[16] While I am not suggesting that Saranac Lake itself be turned into a museum, it is nevertheless interesting to conceive of such a group of structures as a series of "integrated health-care artifacts."

Figure 8. Dr. Edward Livingston Trudeau's cottage, "Little Red," at Saranac Lake

The Octagon House

Another example of the domestic dwelling or residence being interpreted from a medical museological point-of-view is the octagon-shaped house. Figure 9 is a good example of such a structure in Picton, Ontario, which illustrates the merging of form and function. The popularity of the octagon design resulted from the writings of Orson Squire Fowler, the American best known for his promotion of phrenology.[17] Fowler was less interested in aspects of medicine or disease than he was about the promotion of health (and wealth). His philosophy, as espoused in his mid-nineteenth-century book *The Octagon House, A Home for All*, recommended a structure that would be healthful, well-ventilated, and well-plumbed in order to provide a healthy environment for its residents (fig. 10).[18] (For Fowler, an octagon-shaped building provided a superior support as well to doors, windows, plumbing, and heating). Fowler's advocacy of phrenology places him on the medical fringe, but his octagon house represents, in a way, a physical monument to other aspects of his overall philosophy of health.

One can find many octagonal structures in the northeastern United States and southwestern Ontario.[19] Noteworthy with respect to the section of Ontario that borders upper New York State, at

Figure 9. Octagon structure at Picton, a surviving example of a once-popular alternative design in southwestern Ontario

least, is that the residents of the area were most likely to engage in other alternative medical practices (including Thomsonianism).[20] It is interesting to conjecture whether one can correlate the pursuit of sectarian medical treatments elsewhere with architectural structures. Regardless, the octagon house is another example of three-dimensional artifacts much larger than those typically dealt with by museum personnel yet deserving of greater analysis within a medical museological context.

The Physician's Office

One last rather prosaic but highly significant building will be mentioned: the physician's conjoined home and office. In that domestic structure a great deal of health care took place.[21] A useful example is the home and office of Dr. Abraham Groves of Fergus, Ontario (fig. 11). Groves practiced in the area from the 1870s to the 1930s, and his career clearly demonstrated the amalgamation of the "personal" and "professional" spheres in a single building.[22] Yet as the profession of medicine evolved in the twentieth century, the personal and professional were increasingly divorced, with place of work and place of residence becoming increasingly distinct and distant. Similarly, as physicians' offices and homes became separated, each also became remote from general hospitals. Demographic patterns and changes in the urban landscape continue to enforce that distance.[23]

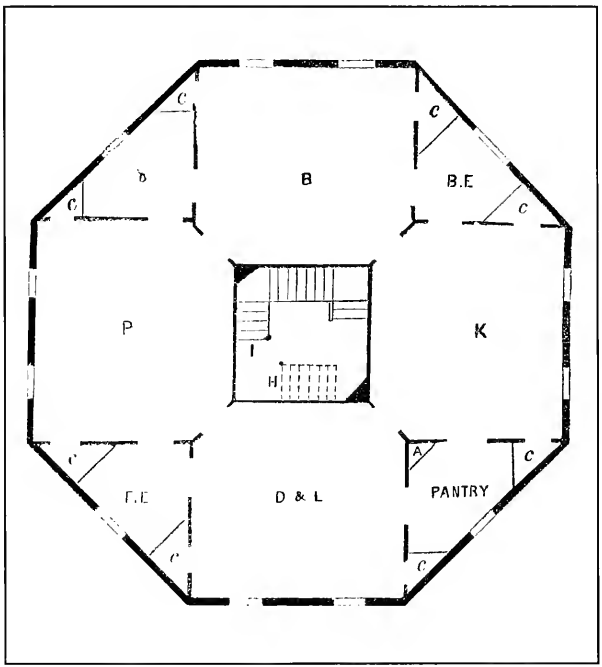

***Figure 10. Orson Squire Fowler's ideal design featured a central stairway with quick access to all rooms. This diagram is from his* Creative and Sexual Science . . . as Taught by Phrenology and Physiology.**

Conclusion

This brief pictorial essay has presented the notion that buildings and other medical structures may be viewed as artifacts. Such an approach further increases the domain and scope of medical museologists. I have not advocated that the artifacts be disassembled and perhaps reassembled in a museum—but

that is an intriguing thought. Rather, I suggest only that they be viewed as artifacts and interpreted as such.

We might also take a lesson from our colleagues elsewhere in the humanities. It is generally accepted, for example, that ecclesiastic structures are worthy of analysis and commentary. Why not interpret our medical temples and other aspects of the larger material culture of health care in an analogous manner? After all, both architectural genres have been influenced by the functions they house and perform, the social groups and personnel they serve, and prevailing notions of style. Moreover, as places where healing—spiritual and somatic—is hoped to take place, the church and the hospital also share a common intellectual root and purpose.

■

Figure 11. Combined home and office of Dr. Abraham Groves of Fergus, Ontario

Notes

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2. The standard source remains John D. Thompson and Grace Goldin, *The Hospital: A Social and Architectural History* (New Haven: Yale University Press, 1975). See also Jeremy Taylor, *Hospital and Asylum Architecture in England 1840–1914: Building for Health Care* (Dorset: Mansell, 1991); Taylor, "Circular Hospital Wards: Professor John Marshall's Concept and Its Exploration by the Architectural Profession in the 1880s," *Medical History* 32 (1988): 426–48; Adrian Forty, "The Modern Hospital in England and France: The Social and Medical Uses of Architecture," in *Buildings and Society: Essays on the Social Development of the Built Environment*, ed. Anthony D. King (London: Routledge & Kegan Paul, 1980), pp. 61–93; Eberhard H. Zeidler, *Healing the Hospital: McMaster Health Science Centre, Its Conception and Evolution* (Toronto: Zeidler Partnership, 1974); Karen Kingsley, "The Architecture of Nursing," *Images of Nurses*, pp. 63–94.

3. See his "Asepsis and the Transformation of Surgical Instruments," *Transactions & Studies of the College of Physicians of Philadelphia*, ser. 5, 13 (1991): 75–91, and *Surgical Garb: 1870–1920* (Cleveland: Historical Division, Cleveland Health Sciences Library, 1982).

4. R. A. Stephen and L. M. Smith, *St. Joseph's Hospital, 1888–1988: Faith and Caring* (London, ON: St. Joseph's Health Centre of London, Ontario, 1988).

5. Edward F. Stevens, *The American Hospital of the Twentieth Century* (New York: Architectural Record Company, 1921), especially pp. 358–65.

6. W. G. Cosbie, *The Toronto General Hospital 1819–1965: A Chronicle* (Toronto: Macmillan of Canada, 1975).

7. Roger S. Ulrich, "View Through a Window May Influence Recovery from Surgery," *Science* 224 (1984): 420–21; Anthony Hiss, *The Experience of Place* (New York: Vintage Books, 1991).

8. The most reliable source is H. E. MacDermot, *A History of the Montreal General Hospital* (Montreal: Montreal General Hospital, 1950).

9. Charles E. Rosenberg, *The Care of Strangers: The Rise of America's Hospital System* (New York: Basic Books, 1987), especially pp. 109–15.

10. S. E. D. Shortt, *Victorian Lunacy: Richard M. Bucke and the Practice of Late Nineteenth-Century Psychiatry* (New York: Cambridge University Press, 1986); Cheryl Krasnick, "'In Charge of the Loons': A Portrait of the London, Ontario Asylum for the Insane in the Nineteenth Century," *Ontario History* 74 (1982): 138–84; *Richard Maurice Bucke: A Catalogue Based upon the Collections of the University of Western Ontario Libraries*, ed. Mary Ann Jameson and Daniel Brock (London: University of Western Ontario, 1978).

11. Useful case studies include Barry Edginton, "Moral Treatment to Monolith: The Institutional Treatment of the Insane in Manitoba, 1871–1919," *Canadian Bulletin of Medical History* 5 (1988): 167–88, and Edginton, "The Well-Ordered Body: The Quest for Sanity Through Asylum Architecture," paper presented at the annual meeting of the Canadian Society for the History of Medicine, Ottawa, June 1993. See also Tom Brown, "Architecture as Therapy," *Archivaria* 10 (1980): 99–123, and Andrew Scull, "A Convenient Place to Get Rid of Inconvenient People: The Victorian Lunatic Asylum," in *Buildings and Society*: pp. 37–60.

12. See, for example, Thomas A. Markus, "Buildings for the Sad, the Bad, and the Mad in Urban Scotland, 1780–1830," in *Order in Space and Society: Architectural Form and Its Context in the Scottish Enlightenment*, ed. Markus (Edinburgh: Mainstream, 1982).

13. Edward Livingston Trudeau, *Autobiography* (Philadelphia: Lea and Febiger, 1916); Robert Taylor, *Saranac: America's Magic Mountain* (Boston: Houghton Mifflin, 1986).

14. A recent analysis of United States history is Barbara Bates, *Bargaining for Life: A Social History of Tuberculosis, 1876–1938* (Philadelphia: University of Pennsylvania Press, 1992); for Canada, see J. T. H. Connor, *A Heritage of Healing: The London Health Association and Its Hospitals* (London, ON: London Health Association, 1990), and George Jasper Wherrett, *The Miracle of the Empty Beds: A History of Tuberculosis in Canada* (Toronto: University of Toronto Press, 1977).

15. Philip L. Gallos, *Cure Cottages of Saranac Lake: Architecture and History of a Pioneer Health Resort* (Saranac Lake: Historical Saranac Lake, 1985). For additional information, see Leslie Maitland, "The Design of Tuberculosis Sanatoria in Late-Nineteenth Century Canada," *Society for the Study of Architecture in Canada Bulletin* 14 (1989): 5–13.

16. Kenneth Hudson, *Museums of Influence* (Cambridge: Cambridge University

Press, 1987), pp. 160–66; Paule Renaud, "Museums: To Know and Be Known," in *Museological Trends in Quebec*, ed. Michel Côté (Montreal: Société des musées québécois, 1992), pp. 115–26.

17. Madeleine B. Stern, *Heads & Headlines: The Phrenological Fowlers* (Norman: University of Oklahoma Press, 1971).

18. See Orson S. Fowler, *The Octagon House; A Home for All* (1853; reprint, New York: Dover, 1973).

19. John I. Rempel, *Building with Wood and Other Aspects of Nineteenth Century Building in Central Canada* (Toronto: University of Toronto Press, 1980), especially Ch. 8.

20. J. T. H. Connor, "A Sort of Felo-de-Se: Eclecticism, Related Medical Sects, and Their Decline in Victorian Ontario," *Bulletin of the History of Medicine* 65 (1991): 503–27.

21. For specific museological discussions, see James M. Edmonson, "The Medical Period Room," *Caduceus* 3 (Winter, 1987): 26–43, and J. T. H. Connor, "An Alternative Perspective: The Medical Period Room," *Caduceus* 3 (Winter 1987): 44–48.

22. Abraham Groves, *All in the Day's Work* (Toronto: MacMillan, 1934); William B. Spaulding, "Abraham Groves (1847–1935): A Pioneer Ontario Surgeon, Sufficient Unto Himself," *Canadian Bulletin of Medical History* 8 (1991): 249–62; James M. Edmonson, "Groves' Amputation Knife," *Canadian Bulletin of Medical History* 8 (1991): 289–91.

23. For a study of one small Ontario town (Kingston), see John E. Tunbridge, "Separation of Residence from Workplace: A Kingston Example," *Urban History Review* 3–78 (1979): 23–32.

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Scholarship in the History of Medical Technology

"If physicians accept a fundamentally mechanical view of human beings in a world that is more and more enamored of technology, the prospect for the future of medicine is disquieting."

Stanley Reiser, *Medicine and the Reign of Technology*[1]

Over the past several decades medical historians have been concerned with what they regard as the social, economic, and nonscientific contexts of medicine and its institutions. In keeping with those objectives, Stanley Reiser's book *Medicine and the Reign of Technology* has documented the increasing isolation of physician from patients following the introduction of diagnostic instruments in the nineteenth century. Reiser's thesis has been used to document and confirm the negative impact of medical technology on the doctor-patient relationship, dampening, to some extent, further debate and other investigations, thereby relegating the history of medical technology to an insignificant subtheme in modern medicine.

Medical objects are continually being reevaluated and interpreted in response to the quality and quantity of scholarship devoted to them, yet the history of medical technology remains a minor interest of medical historians. Books and papers on medical technology are not among those most cited and admired by historians of medicine in America, according to Ronald L. Numbers's survey published in 1982.[2] John Harley Warner, in 1985, further clarified the medical historian's approach and, incidentally, the significance of medical technology, by asserting that historians have broadened the range of questions they have asked about science in medicine. The result of that expanded querying has been to amass evidence to conclude that the progressive infusion of scientific knowledge and methods into medicine has not resulted in improved patient care.[3] Some of the factors for that increasingly anti-science/technology perspective or bias include the movement to free patients from harsh and overbearing psychiatric hospitals, an interest in self-help treatment, studies into women's health care, the increasing cost of technology in medicine, and the acceptance of Ivan Illich's thesis that scientific medicine has become hazardous

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to people's health.[4] Those arguments are interesting for their critique of a major modern medical approach, yet they require responses from those who are more intimately involved and aware of medical technology and its consequences for patients.

The technology of medicine is not a monolith that encompasses only instruments, manufacturers, medical specialties, and "high-tech" methods of treatment. The broader interests of medical historians should also be applied to studies in the history of medical technology in order to provide other contexts in which to evaluate and understand the use of medical technology. Exploring the complex technological-social-economic-political interface of medicine—especially from the perspective of nontraditional and a less self-centered emphasis on technology—is crucial to understanding why, how, and to what extent western medicine and, in particular, American medicine evolved into a scientific, technology-based enterprise.

The implications of technology for medical practice based on Reiser's thesis that "if physicians accept a fundamentally mechanical view of human beings in a world that is more and more enamored of technology, the prospect for the future of medicine is disquieting," call for more sophisticated and extensive historical investigation.[5] If we cannot assume that the more machines do, the more physicians will interact with patients, it is especially important to know more about the rise and function of medical technology and its continued

Collection of items related to David the Bubble Boy, who was born with a severe combined immune deficiency and lived for twelve years in a germ-free environment (or plastic bubble) under the care of Dr. William T. Shearer. Autopsy revealed that his death, following a bone-marrow graft, was the result of a neoplasm that developed from a virus transplanted into his marrow. Keeping David alive under such constraining conditions (NASA provided a spacesuit that allowed him to leave the bubble in the hospital for brief periods) raises ethical questions about the uses and consequences of sophisticated medical technology. These items were donated to the National Museum of American History after David's death in 1984.

reputation among the public for providing more effective medicine.

Concentration on some of the finer points of medical technology await future investigators and new insights. Christopher Lawrence presents an instance in his article "'Definite and Material': Coronary Thrombosis and Cardiologists in the 1920s," which demonstrates that using instrument-generated data from the ECG provided a measure of "interpretive flexibility" to investigators.[6] The ECG, in one sense, was interpreted to respond to social processes to produce medical "facts" needed to diagnose myocardial infarction. Around World War I, physicians attempting to create a specialty of cardiology based on organic differences as noted by the ECG argued for discarding cardiac diseases diagnosed on the basis of functional symptoms and "cardiac neuroses."

One of the results of diagnosis-based medicine was to rid the specialist of treating unwanted patients, which one cardiologist described in 1919 as "an anemic and pampered old spinster who consults physician after physician for her heart."[7] May we interpret the male-created and fostered specialty of cardiology as an explicit or implicit effort to restrict its patient population to men? Three quarters of a century later myocardial infarction in females is only beginning to receive medical attention on a par with that given to males. Such gender-specific instruments as obstetric forceps and specula, for example, when applied on a gender- or ethnic-specific basis, warrant more study. Katherine Ott's current postdoctoral project at the National Museum of American History titled "Medicine, Technology, and Work in the Nineteenth Century" promises to reveal some of the neglected and social aspects of medical technology in America.

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Notes

1. The book was published in 1978 by Cambridge University Press; the quotation is on p. 229.

2. Numbers, "The History of American Medicine: A Field in Ferment," *Reviews in American History* 10 (1982): 245-63.

3. Warner, "Science in Medicine," *Osiris* 1 (1985): 38.

4. Ibid., p. 39.

5. Reiser, *Medicine and the Reign of Technology*, p. 229.

6. The essay appeared in *Framing Disease: Studies in Cultural History*, ed. Charles E. Rosenberg and Janet Lynne Golden (New Brunswick: Rutgers University Press, 1992).

7. Ibid., p. 74.

Credits

Pages 72, 73, 75, 132: Courtesy of the author.

Pages 78, 79, 80, 81, 82, 83, 84: Courtesy of the author.

Page 78: Soprintendenza Archeologica di Napoli e Caserta, Photograph 1251.

Page 80: Figure 4, Römisch-Germanisches Zentralmuseum, T63/1014.

Pages 81, 82, 83: Römisch-Germanisches Zentralmuseum, T63/1015, L1036/3, L1031/3.

Pages 89, 90, 91, 92, 93, 94: Courtesy of the author.

Page 100: Broadside Collection, Chicago Historical Society, ICHi 23639.

Pages 114, 116: Courtesy of the author.

Pages 121, 122, 123, 124, 125, 126, 128: Courtesy of the author.

Page 127: O. S. Fowler, *Creative and Sexual Science . . . as Taught by Phrenology and Physiology* (n.p., n.d.), p. 988.

Cover illustration: These medical instruments are from The Pearson Museum, Department of Medical Humanities, Southern Illinois University School of Medicine at Springfield, assembled with the assistance of Barbara Mason, Curator, and Jill Pearson. Photograph by Diana Kleidon, Photography, Division of Biomedical Communications, Southern Illinois University School of Medicine.

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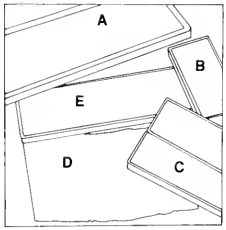

A. Direct venous pressure apparatus, ca. 1950, made by Becton, Dickinson & Co. of Rutherford, New Jersey.

B. Gradle Schiotz tonometer, ca. 1920, made by the American Optical Company of Southbridge, Massachusetts.

C. Bone handle eye instrument kit, nineteenth century. One handle bears the mark Otto & Reynders.

D. Pocket surgical kit of Dr. W. C. Maxwell containing instruments from a number of different manufacturers.

E. Surgical instrument case made by the Mallier Drug Company of St. Louis.

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